G. PULLA REDDY ENGINEERING COLLEGE (Autonomous): KURNOOL

Accredited by NBA of AICTE and NAAC of UGC
An ISO 9001:2008 Certified Institution
Affiliated to JNTUA, Anantapuramu

Scheme – 2017

Scheme and Syllabus for Four year B.Tech. Degree Course in **CSE**

Department of Computer Science and Engineering
G. Pulla Reddy Engineering College (Autonomous): Kurnool
Accredited by NBA of AICTE and NAAC of UGC
Affiliated to JNTUA, Anantapuramu.

Vision and Mission of the Department:

Vision :

The department aims to become a leader in the field of education, training and research in Computer Science and Engineering.

Mission :

Mission 1: The department strengthens the core competence in computer Science and Engineering by imparting quality education and training.

Mission 2: To promote innovation and research through collaborative and participatory approaches.

Mission 3: To inculcate the leadership capabilities, ethical values and professional behavior to face the challenges in global market.

Program Educational Objectives(PEOs)

Program Educational Objectives(PEOs) of the under graduate programme in Computer Science and Engineering at G.Pulla Reddy Engineering College (Autonomous), Kurnool are to prepare the graduates to possess the ability to

PEO1: Analyze, Design and Develop computer based systems and applications using core areas of Computer Science & Engineering.

PEO2: Be engineering professionals, innovators, entrepreneurs engaged in their profession with social awareness and ethical values.

PEO3: Work in teams in multi-disciplinary areas to address the needs of society.

Program Specific Outcomes(PSOs) :

PSO1 : Understand the principles, structure and development methodologies of system software

PSO2 : Design, develop, implement and test application software for systems including distributed software systems.

PSO3 : Understand the architecture and organization of computer systems, embedded systems and networked systems.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination

(Effective from 2017-2018)

CSE– III Semester **Scheme: 2017**

S. No	Course No.	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T/D	P	End Exam Marks	Internal Assessment Marks	Total Marks
I		**Theory**							
1.	HU201	Managerial Economics and Financial Accountancy	3	3	0	0	60	40	100
2.	CS201	Discrete Mathematics	3	3	0	0	60	40	100
3.	CS202	Switching Theory and Logic Design	3	3	0	0	60	40	100
4.	CS203	Advanced Data Structures	3	3	0	0	60	40	100
5.	CS205	Database Management Systems	3	3	0	0	60	40	100
6.	CS207	Computer Organization & Architecture	3	3	0	0	60	40	100
7.	ML01	Constitution of India	-	2	-	-	-	-	-
II		**Practical**							
8.	CS204	Advanced Data Structures Lab	1	-	-	2	50	50	100
9.	CS206	Data Base Management Lab	1	-	-	2	50	50	100
10.	HU203	Advanced Communication Skills Lab	1	-	-	2	-	100	100
		Total	**21**	**20**	**0**	**06**	**460**	**440**	**900**

FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination

(Effective from 2017-2018)

CSE – IV Semester **Scheme: 2017**

S. No	Course No.	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T/D	P	End Exam Marks	Internal Assessment Marks	Total Marks
I		**Theory**							
1.	BS204	Probability & Statistics	3	3	0	0	60	40	100
2.	CS208	Object Oriented Programming	3	3	0	0	60	40	100
3.	CS210	Operating System	3	3	0	0	60	40	100
4.	CS211	Computer Networks	3	3	0	0	60	40	100
5.	CS212	Design & Analysis of Algorithms	3	3	0	0	60	40	100
6.	CS213	Software Engineering	3	3	0	0	60	40	100
7.	ML02	Environmental Studies	-	2	-	-	-	-	-
II		**Practical**							
8.	EC212	Basic Electronics Lab	1	-	-	2	50	50	100
9.	CS209	Object Oriented Programming Lab	1	-	-	2	50	50	100
10.	HU204	Soft Skills Lab	1	-	-	2	-	100	100
		Total	**21**	**20**	**0**	**06**	**460**	**440**	**900**

MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTACY (MEFA)

III Semester: Common for CSE and ECE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
HU201	Foundation	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	-	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the nature and scope of managerial economics and various concepts of demand analysis

CO2: Understand the significance of demand elasticity and different concepts of demand forecasting

CO3: Understand the concepts of production and cost analysis and different market structures and their competitive situations

CO4: Understand the concept and significance of capital budgeting

CO5: Understand the principles and significance of accountancy and preparation of final accounts

UNIT– I

Introduction to Managerial Economics & Demand :

Managerial Economics- Definition, Nature and Scope; Demand -Meaning, Types of Demand, Demand Determinants, Law of Demand and its exceptions, Law of Diminishing Marginal Utility, Indifference curve.

UNIT– II

Elasticity of Demand and Demand Forecasting:

Elasticity of Demand-Types, Measurement and Significance;

Demand forecasting –Importance, Factors, Purposes, Methods of Demand Forecasting

UNIT– III

Theory of production & cost analysis and Market Structures:

Production Analysis*:* Meaning, Isoquants &Isocosts, The law of diminishing Marginal Returns, Law of Returns to Scale, Internal and External Economies of scale.

Cost Analysis – Cost concepts, Cost output relationship for Short Run and Long Run, Break Even Analysis – Its Importance, Limitations and Managerial uses

Market Structures: Types and Features of different market structures–Perfect Competition – Monopoly – Monopolistic and Oligopolistic; Price output determination in case of perfect competition and Monopoly.

UNIT– IV

Capital and Capital Budgeting:

Introduction: significance of capital budgeting, steps in capital budgeting, optimum level of capital, decision to invest under certainty-payback period method, net discounted present value method, internal rate of return method, sources of capital, decision to invest under risk and uncertainty

UNIT– V

Introduction to Financial Accountancy:

Principles of Accountancy: Introduction, Double Entry System of Book Keeping-, Journal, Ledger, Preparation of Trial balance

Preparation of Final Accounts: Trading Account, Profit & Loss Account, and Balance Sheet with adjustments, Final Accounts problems.

Text Books :

1. A.R. Aryasri, Managerial Economics and Financial Analysis,McGrawHill Education

Reference Books :

1) Varshiney and Maheswari, Managerial Economics, Sultan Chand & Co, New Delhi
2) Vanita Agarwal, Managerial Economics, Pearson Education
3) Domnick Salvatore: Managerial Economics in a Global Economy, 4th Edition, Thomson
4) S.P.Jain and K.L.Narang, Financial Accounting

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

DISCRETE MATHEMATICS (DM)

III Semester : CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS201	Professional Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	-	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the mathematical representation of statements using connectives, normal forms, equivalence and implications.

CO2: Calculate numbers of possible outcomes of elementary combinatorial processes such as permutations and combinations.

CO3: Solve homogenous and Inhomogeneous recurrence relations using substitution method and generating functions.

CO4: Understand the concept of planar graphs, Hamiltonian graphs, Euler graphs, spanning trees and binary trees.

CO5: Understand the association between the elements of sets using digraphs and Warshall's Algorithm.

UNIT– I

Mathematical Logic

Statements & Notation, Connectives, Well Formed Formulas, Equivalence & implications, Duality law, Other connectives.

Normal forms

Normal forms- Principle Disjunctive Normal form, Principle conjunctive Normal form, Theory of inference for statement calculus.

UNIT– II

Elementary Combinatorics

Permutations & Combinations, Enumeration of Combinations and Permutations without repetition, Combinations with repetition, Principle of Inclusion-Exclusion.

UNIT– III

Recurrence Relations

Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, The method of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relations.

UNIT– IV

Graphs

Basic Concepts, Isomorphism and Sub graphs, Trees and Their Properties, Spanning Tress-Depth First search and Breadth First search, Minimal Spanning Trees, Binary Trees, Planar and Non planar Graphs, Euler's Formula, Hamiltonian Graphs, Chromatic Numbers.

UNIT– V

Relations and Digraphs

Introduction, Properties of Binary Relations, Equivalence Relations, Digraphs, Partially ordered sets, Special elements of POSET, Hasse Diagram, Lattices and their properties, Transitive Closure, Warshall's algorithm.

Text Books :

1. Trembly.J.P and manohar.R [2011], Discrete mathematical structures with applications to computer science, Mc-Graw-Hill International Editions.
2. Joe L.Mott, Abraham Kandel and Theodore P.Baker [2008], [2nd Edition], Discrete Mathematics for Computer Scientists and Mathematicians, PHI.

Reference Books :

1. Dr. S.Chandrasekharaiah, Mathematical foundations of computer science, -Prism books Pvt.Ltd.
2. Ralph P.Grimaldi [2006], [5th Edition], Discrete and Combinational Mathematics-An Applied Introduction, Pearson Education.
3. Liu [2004], Elements of discrete mathematics, McGraw-Hill.

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

SWITCHING THEORY AND LOGIC DESIGN (STLD)

III Semester: CSE						Scheme: 2017		
	Category	Hours/Week			Credits	Maximum Marks		
CS202	Professional Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	-	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understanding number conversions, Error detection and correction mechanisms: parity, checksum, hamming codes.

CO2: Apply the Axioms and theorems of Boolean Algebra for minimization of Boolean functions, canonical forms.

CO3: Apply the minimization procedures using Karnaugh map, Tabulation method, prime implication chart to obtain minimal SOP and POS.

CO4: Design combinational circuits: Encoders, Decoders, Multiplexers, ROM, PLA.

CO5: Design Sequential circuits using Flip-flops and sequential logic.

CO6: Design Registers: Shift Register, Bi directional Shift Register and counters: Ring Counter, Johnson Counter.

UNIT– I

Number System & Binary Codes: The Decimal, Binary, Octal, Hexadecimal Number System, Number Base Conversions, Complements, Binary Arithmetic in Computers, Weighted Binary codes, Non Weighted Binary codes, Error Detecting Codes, Error Correcting Codes, Parity Checking.

Boolean Algebra & Minimization of Boolean Functions: Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic gates.

UNIT– II

Simplification of Boolean Functions: The Map Method, Two, Three, Four, Five and Six variable maps, Product of Sums Simplification, NAND and NOR Implementations, Other two Level Implementations, Don't Care Conditions, The Tabulation Method, Determination of Prime Implicants, Selection of Prime Implicants.

UNIT– III

Combinational Logic: Introduction, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure, Multilevel NAND Circuits, Multilevel NOR Circuits, Exclusive-or and Equivalence Functions.

Combinational Logic with MSI & LSI: Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoders, Multiplexers, Read Only Memory (ROM), Programmable Logic Array (PLA).

UNIT– IV

Sequential Logic: Introduction, Flip Flops, Triggering of Flip Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip Flop Excitation Tables, Design Procedure, Design of Counters, Design with State Equations.

UNIT– V

Registers: Introduction, Registers - Registers with parallel load, Sequential Logic Implementation, Shift Registers - Serial Transfer, Bi-directional Shift Register with parallel load, Serial Addition.

Counters : Ripple Counters - Binary Ripple Counter, BCD Ripple Counter, Synchronous Counters - Binary Counter, Binary Up-Down Counter, Johnson Counter.

Text Books :

1. M.Morris Mano , Digital Logic and Computer Design, Pearson Education, IV Edition, 2011

Reference Books :

1. ZviKohavi [2008], Switching and Finite Automata Theory, TMH.
2. F.J.Hill and G.R.Peterson [1981], [3rd Edition], Introduction to switching theory and logic Design.
3. Donald D. Givone [2006], [4rd Edition], Digital Principles and Applications, Tata McGraw Hill.

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

ADVANCED DATA STRUCTURES (ADS)

III Semester: CSE						**Scheme:** 2017		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
CS203	Professional Core	3	0	0	3	**40**	**60**	**100**
Sessional Exam Duration: 2 Hrs						**End Exam Duration:** 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the concept of Class, Object and Dynamic Memory allocation in C++.

CO2: Illustrate the applications of Linked Lists, Stacks and Queues.

CO3: Comprehend the operations performed on Binary Search Trees and AVL Trees.

CO4: Understand the Operations and Applications of Heaps.

CO5: Organize the data using various Hashing Techniques for efficient Searching.

UNIT– I

Introduction to C++

Structure of a C++ program, Class, Object, Scope Resolution operator, Defining Member functions, Constructors, Dynamic Memory allocation.

UNIT– II

Review of Elementary Data Structures: Arrays, Linked Lists, Stacks, Queues

Applications of Linked lists: Polynomial manipulation.

Applications of Stacks: Recursion, Quick sort, Polish notations, Conversion of infix notation to postfix notation, Postfix expression evaluation.

Applications of Queues: Breadth First Search.

UNIT– III

Non Linear Data Structures:

Operations on Binary Search Trees, AVL Trees and their operations, Threaded Binary Trees.

Special Trees: Splay Trees, B-Trees and their operations.

UNIT– IV

Priority Queues (Heaps):

Simple Priority Queues- Implementation using arrays and linked lists, Binary Heaps.

Applications of Binary heap- Heap Sort; d-heaps, Leftist Heaps, Skew Heaps, Binomial Queues

UNIT– V

Hashing Techniques:

Hashing Definition, Hash functions, Open Hashing (Separate Chaining), Closed Hashing (Open Addressing)- Linear Probing, Quadratic Probing, Double Hashing; Rehashing, Extendible Hashing.

String Searching Techniques:

History, Brute-Force algorithm, Knuth-Morris-Pratt algorithm, Boyer-Moore algorithm, Robin-Karp algorithm.

Text Books :

1. Herbert Scheldt, [4th Edition], The Complete reference C++, Tata McGraw-Hill
2. Jean Paul Tremblay and Paul G.Sorensen [2007], An introduction to Data Structures with Applications, TMH.
3. Robert Sedgewick, Algorithms in C, Addison-Wesley Publishing Company.

Reference Books :

1. E.Balaguruswamy [2008], Object Oriented Programming with C++
2. Mark Allen Weiss, Data Structures and Algorithm Analysis in C [Second Edition].
3. GAV Pai, Data Structures and Algorithms, Tata McGraw Hill Publications.

Web References:

1. https://www.cprogramming.com/algorithms-and-data-structures.html
2. https://www.tutorialspoint.com/data_structures_algorithms
3. http://index-of.co.uk/Algorithms/Algorithms%20in%20C.pdf

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

DATABASE MANAGEMENT SYSTEMS (DBMS)

III Semester: CSE						**Scheme: 2017**		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CS205	Professional Core	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
		3	**0**	**-**	**3**	**40**	**60**	**100**
Sessional Exam Duration: 2 Hrs						**End Exam Duration: 3 Hrs**		

Course Outcomes: At the end of the course students will be able to

CO1: Design ER model for a practical Real life system.

CO2: Use SQL commands to create, update, modify and retrieve data from the data bases.

CO3: Understand the importance of Good database design and indexing.

CO4: Understand the properties of transactions in a database system.

CO5: Understand Concurrency control techniques and Recovery system.

UNIT– I

Introduction: Introduction to DBMS, Purpose of Database Systems, Database System Applications, View of Data, Data Models, Database Users, Database Architecture.

Entity-Relationship Model: Basic Concepts, Cardinality of Relationship, ER Diagram Notations, Entity-Relationship Diagrams, Extended E-R Features, Modeling using ER Diagrams, Reduction of an E-R Schema to Tables.

UNIT– II

Structured Query Language (SQL): Introduction to SQL, Data types, Data Definition language commands, Data Manipulation language Commands and Data control Language Commands , Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations.

PL/SQL: Control Structures, Procedures, functions, Triggers and Cursors.

UNIT– III

Relational Database Design: Features of Good Relational database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form, Second Normal Form, Third Normal Form, Boyce Codd Normal Form(BCNF), Fourth Normal Form and Fifth Normal Form.

Indexing and Hashing: Basic Concepts, Ordered Indices, Multilevel Indices, Secondary Indices, Static Hashing and Dynamic Hashing.

UNIT– IV

Transactions: ACID properties of a Transaction, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions.

Serializability : Conflict Serializability, View Serializability, Recoverability –Recoverable and Non Recoverable Schedules, Cascade less Schedules, Testing for Serializability.

UNIT– V

Concurrency control: Lock-Based Protocols, Timestamp-Based Protocols, Validation Based Protocols, Multiple Granularity, Deadlock handling.

Recovery System: Failure Classification, Storage Structure, Recovery and Atomicity- Shadow Paging Technique, Log-Based Recovery.

Text Books :

1. Henry F. Korth& Abraham Silberschatz [2005], [5 Edition], Data Base System Concepts, MC Graw Hill.

Reference Books :

1. C J Date [2008], An Introduction to Data Base Systems, Pearson Education.
2. Raghu Ramakrishna and Johnannes Gehrke [2003], [3rd Edition], Data Base Management Systems, TATA Mc GrawHill.
3. ElmarsiRamez and Navrate Shamkant B [2009], Fundamentals of Data Base Systems, Pearson Education.

Web References:

1. https://www.w3schools.com/sql
2. https://www.tutorialspoint.com/plsql/index.htm

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

COMPUTER ORGANIZATION & ARCHITECTURE (COA)

III Semester: CSE						**Scheme: 2017**		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CS207	Professional Core	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
		3	**0**	**-**	**3**	**40**	**60**	**100**
Sessional Exam Duration: 2 Hrs						**End Exam Duration: 3 Hrs**		

Course Outcomes: At the end of the course students will be able to

CO1: Analyze the Computer Organization and Design of a Basic Computer.

CO2: Impart the knowledge of Programming the Basic Computer and the design of Micro programmed control unit

CO3: Understand the Internal working of an CPU, Pipeling and Vector Processing

CO4: Implement the Computer Arithmetic and understand Input Output Organization

CO5: To understand the concepts RAM, ROM, Virtual Memory and Secondary Storages

UNIT– I

Basic Computer Organization and Design

Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Input/output and Interrupt, Complete Computer Description, Design of Basic Computer.

UNIT– II

Programming The Basic Computer

Introduction, Machine Language, Assembly Language, The Assembler, Programming Arithmetic and Logic Operations.

Micro Programmed Control:

Control Memory, Address Sequencing, Micro program Example, Design of Control Unit.

UNIT– III

Central Processing Unit

Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, RISC and CISC.

Pipeline and Vector Processing

Parallel Processing, Pipelining, Arithmetic and Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

UNIT– IV

Computer Arithmetic:

Introduction, Addition and Subtraction, Multiplication, Division algorithms.

Input/output Organization

Peripheral Devices, Input/output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA.

UNIT– V

The Memory System:

Basic Concepts, Semiconductor RAM memories, Read-Only memories, Speed, Size and Cost, Cache Memories -Mapping Functions, Virtual Memories, Secondary Storage.

Text Books :

1. M. Morris Mano [2011], [3rd Edition], Computer system architecture, Pearson Education, 2011
2. Carl Hamacher, ZvonkoVranesie, SafwatZaky, [5th Edition], Computer Organization, McGraw-

Reference Books :

1. Hayes John .P, Computer architecture & organization, MGH, 1998
2. Willam Stallings, [6 th Edition], Computer Organization and Architecture Designing for performance, Pearson [PHI], 2003

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

CONSTITUTION OF INDIA (CI)

III Semester : CSE						Scheme : 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
ML201	Mandatory	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	-	-	-	-	-	-
Sessional Exam Duration : 2 Hrs								

Course Outcomes : At the end of the course the student will be able to

CO1: Understand the formation and principles of Indian Constitution.

CO2: Understand structure and functions of Union government and State executive. Duties of President, Vice president, Prime Minister, Governor, Chief Minister cabinet and State Legislature.

CO3: Understand constitutional amendments of 42, 44,74,76,86 and 91. Central-State relations, President rule.

CO4: Understand Indian social structure and languages in India. Rights of women, SC, ST and then weaker section.

CO5: Understand the structure of Judiciary, Role and functions of Supreme Court, High court and Subordinate courts, Judicial review.

UNIT - I

Historical back ground, Significance of Constitution, Making of the constitution, Role of the constituent Assembly, Salient features, the Preamble, Citizenship, procedure for amendment of Constitution Fundamental rights-Derivative principles of state policy-Elections in India.

UNIT - II

Union Executive: Structures of Union Government & Functions, President, Vice President, Prime Minister, Cabinet, Parliament- State Executive:Structures and Functions, Governor, Chief Minister, Cabinet, State Legislature

UNIT - III

Central, State Relations, President's Rule, Constitutional Amendments [42, 44, 74, 76, 86 & 91]-Constitutional functionaries, Working of Parliamentary system in India

UNIT - IV

Indian Social Structure, Languages in India-Political Parties & Pressure groups, Rights of Women-S.C"s, S.T"s & other weaker sections.

UNIT - V

Judiciary: Structure, Organisation of Judiciary, independence of the Judiciary, role and functions of Supreme Court, High Courts & Sub ordinate courts, Judicial Review.

Text Books :

1. Durga Das Basu, *"Introduction to the Constitution of India"*, Wedwe& Company
2. Macivel, Page, "An Introduction Analysis", Society
3. M.V. Pylee, *"Indian Constitution"*, S. Chand Publications
4. Subhash C Kashyao : *"Our Constitution"*,NationalBank,Trust, India.
5. Constitutional Law of india by Dr.S.M.Rajan

Reference Books :

1. The Constitution of India.By the Ministry of Law and Justice, The Govt. of India.
2. Constitutional Law of India by kashyapsubhasah ,c
3. Indian constitution Law by M.P.Jain
4. Constitutional Law of India by H.M Seervai

Web References:

1. https://www.india.gov.in/my-government/constitution-india

ADVANCED DATA STRUCTURES LAB (ADS (P))

III Semester: CSE					**Scheme: 2017**		
Course Code	**Hours/Week**			**Credits**	**Maximum Marks**		
CS204	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
	0	0	2	1	**50**	**50**	**100**

Sessional Exam Duration: 2 Hrs **End Exam Duration: 3 Hrs**

Course Outcomes: At the end of the course students will be able to

CO1: Write programs using Class and Object concepts.

CO2: Implement Programs for the applications of Linked lists, Stacks and Queues.

CO3: Perform operations on Binary Search Trees and AVL Trees.

CO4: Develop programs for various Hashing Techniques.

List of Experiments

1. Implementation of Class, Object concepts
2. Application of Linked List: Polynomial operations
3. Applications of Stacks: Conversion of arithmetic expressions from one form to other, Evaluation of Expressions, Recursion
4. Application of Queue: Graph traversals
5. Implementation of Binary Search Tree
6. Implementation of AVL Trees
7. Applications of Binary Heaps
8. Implementation of Hashing Techniques

Reference Books:

1. Herbert Scheldt, [4th Edition], The Complete reference C++, Tata McGraw-Hill.
2. Jean Paul Tremblay and Paul G.Sorensen [2007], An introduction to Data Structures with Applications, TMH.

DATABASE MANAGEMENT SYSTEMS LAB (DBMS (P))

III Semester: CSE					**Scheme: 2017**		
Course Code	**Hours/Week**			**Credits**	**Maximum Marks**		
CS206	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
	0	**0**	**2**	**1**	**50**	**50**	**100**

End Exam Duration: 3 Hrs

Course Outcomes: At the end of the course students will be able to

CO1: Work with the concepts of DDL, DML, DCL Commands.

CO2: Design of databases for real life systems using Oracle.

CO3: Learning of SQL queries on the real life systems.

CO4: Execution of PL/SQL programs for different problems

CO5: Implementation of procedure, function, trigger and cursor concepts in PL/SQL

List of Experiments

1. Perform DDL, DML and DCL commands.
2. Design and create a University Library Data base using ER diagram and Schema Diagram.
3. Design and create a university database consisting of the following tables Department, Course, Instructor and Student using ER Modelling and Schema Diagram.
4. Create various tables like Branch, Account, Depositor, Customer, Loan and Borrower for a banking system with constraints using a Schema diagram.
5. Perform various SQL queries on select clause, where clause, pattern matching, Order by, and Group by.
6. SQL Queries on Set operations, Aggregate functions and Join Operations.
7. PL/SQL program using control Structures
8. Program to implement Procedures and Functions.
9. Program to implement Cursors.
10. Program to implement Triggers.

Web References :

1. https://www.w3schools.com/sql
2. https://www.tutorialspoint.com/plsql/index.htm

ADVANCED COMMUNICATION SKILLS LAB (ACS(P))

III/IV Semester: Common for all Branches				**Scheme : 2017**		
Course Code	**Hours/Week**			**Credits**	**Maximum Marks**	
HU203	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**TOTAL**
	0	**0**	**2**	**1**	**100**	**100**

Course Outcomes : At the end of the course students will be able to

CO1: Speak in English confidently, fluently and effectively.

CO2: Exhibit team playing and leadership skills.

CO3: Give Presentations effectively.

CO4: Comprehend the Verbal and Non-verbal texts.

CO5: Prepare Resume, Company profiles and Project presentations.

CO6: Enhance possibilities of Job prospects.

List of Activities

Focus in the lab is more on fluency than on accuracy

1. Ice breaking Activities
2. JAM
3. Listening Comprehension – Practice tests
4. Oral Presentation
5. Presentation Strategies
6. Group Discussion – Team Playing, Leadership Skills
7. Debate
8. Information Transfer – Verbal to Non-verbal and Vice-Versa
9. Resume Preparation
10. Company Profiling
11. Interview Skills – a) Telephonic Interview
    b) Personal Interview
12. Project Presentation

Reference Books :

1. Communication Skills, Sanjay Kumar and PushpLata, Oxford University Press.
2. English Language Laboratories A Comprehensive Manual, NiraKonar, PHI.
3. Technical Communication 3 E, Raman and Sharma, Oxford University Press.
4. Personality Development and Soft Skills, Barun k. Mitra, Oxford University Press.

PROBABILITY AND STATISTICS (PS)

IV Semester : CSE						Scheme : 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
BS204	Foundation	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional Exam Duration : 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes : At the end of the course the student will be able to
CO1: Gain the knowledge on Mathematical Statistics and probability theory
CO2: Classify discrete and continuous distributions
CO3: Understand the test of hypothesis for large samples
CO4: Analyze the Test of significance for small samples
CO5: Find correlation coefficient and classification of ANOVA
UNIT – I
Statistical Methods: Introduction to statistics, Frequency distribution, Measures of Central Tendency, Measures of dispersion, Moments.
Probability: Basic concepts of probability, Addition and Multiplication law of probability, Mathematical Expectation -Variance and Co-variance.
UNIT - II
Probability Distributions: Random variable – Discrete and continuous probability distributions and Functions; Binomial, Poisson and Normal distributions.
UNIT – III
Test of Hypothesis: Population and sample, Confidence interval of mean, Statistical hypothesis – Null and Alternative hypothesis, Level of Significance and Critical region, Z-test for means and Proportions.
UNIT - IV
Test of Significance: Student t-test - sample mean, difference between sample means and paired Student t-test, F – test, Chi-square test –Goodness of fit and independence of attributes.
UNIT - V
Correlation: Co-efficient of Correlation, Lines of regression and Rank Correlation.
Analysis of Variance : ANOVA for One-way classification , ANOVA for Two-way classification
Text Books
1. Gupta and Kapur Fundamentals of Mathematical Statistics; S.Chand & Company, New Delhi.
2. T.K.V.Iyengar and others -Probability And Statistics, S.Chand & Company, 5th Edition, 2015.
3. B.S.Grewal [2012], Higher Engineering Mathematics, Khanna Publishers,NewDelhi.

Reference Books

1. K.Murugesan & P.Gurusamy , Probability And Statistics , Anuradha Publications
2. Probability And Statistics , Murray R Spiegal and others , Schaum's series, Tata Mcgraw Hill Education.
3. Leomard Kazmier , Business Statistics , Schaum's series, Tata Mcgraw Hill Education

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

OBJECT ORIENTED PROGRAMMING (OOP)

IV Semester: CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS208	Professional Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	-	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand fundamentals of oop concepts, class, input and output

CO2: Explain Inheritance, packages and interface

CO3: Illustrate string handling methods, exception handling

CO4: Apply multi threading concepts, files

CO5: Understand applet programming, AWT and event handling

UNIT– I

Object oriented concepts:

Fundamentals, Overview of Java, Java buzzwords, Data types, variables and arrays. Operators, control statements. Introducing Classes: Class fundamentals, declaring objects, introducing methods, Constructors, Reading console input, writing console output, this keyword, garbage collection, finalize.

UNIT– II

Inheritance:

Inheritance basics, using super, method overriding, dynamic method dispatch, abstract class, using final with inheritance.

Packages and Interfaces:

Defining package, access protection, importing packages. Interfaces: Defining interface, implementing interface

UNIT– III

String Handling:

String constructors, Special string operations, character extraction, string comparison, searching strings, modifying strings. StringBuffer class and its methods.

Exception Handling:

Fundamentals, exception types, try, catch, throw, throws, finally. Java built-in exceptions, creating your own exception subclasses.

UNIT– IV

Multithreading:

Java thread model, Main thread, creating a thread, creating multiple threads, Thread class and its methods, isAlive( ), join( ), thread priorities, synchronization, interthread communication.

Files:

Reading and writing files

UNIT– V

Applet:

Applet basics and Applet class.

AWT Controls: Label, Button, Checkbox, Checkbox Group, Choice, List, Scrollbar, TextField, TextArea.

Event Handling: Delegation event model, Event Classes, sources of events, event listener interfaces. Adapter classes.

Text Books :

1. Herbert Schildt [2008], [5th Edition], The Complete Reference Java2, TATA McGraw-Hill.
2. E Balaguruswamy [2007], [3rd Edition], Programming with Java, A Primer, TATA McGraw-Hill

Reference Books :

1. Bruce Eckel [2008], [2nd Edition], Thinking in Java, Pearson Education.
2. H.M Dietel and P.J Dietel [2008], [6th Edition], Java How to Program, Pearson Ed.

Web References:

1. https://www.tutorialspoint.com/java/index.htm

Question Paper Pattern:

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End Exam

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OPERATING SYSTEM (OS)

IV Semester: CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS210	Professional Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	-	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course, the students will be able to

CO1: Understand the OS design structures and its services.

CO2: Understand the concepts of process scheduling, synchronization and its implementation.

CO3: Exemplify the memory management techniques and virtual memory.

CO4: Understand the structure and organization of file system and secondary storage structure.

CO5: Understand Deadlock handling mechanisms, Protection and Security services and Linux Case Study.

UNIT– I

Introduction:

What Operating Systems Do, Operating System Structure, Operating System Operations, Overview of Process Management, Memory Management, Storage Management, Protection and Security, Computing Environments

Operating System Structures:

Operating System Services, User Operating System Interface, System Calls, Types of System Calls, Operating System Structure.

UNIT– II

Process Management:

Processes-Process Concept, Process Scheduling, Operations on Processes, Inter process Communication, Examples of IPC Systems, Threads- Overview, Multicore Programming, Multithreading Models.

***Synchronization*:** Background, The Critical-Section Problem, Peterson's Solution, Semaphores, Classic problems of Synchronization, Monitors.

***Process Scheduling*:**

Basic concepts, Scheduling Criteria, Scheduling Algorithms, Real Time CPU Scheduling-RMS & EDF

UNIT– III

Memory Management:

Main Memory Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page table.

Virtual Memory Background, Demand paging, Page Replacement, Allocation of Frames, Thrashing.

UNIT– IV

Storage Management:

***Mass Storage Structure*:** Overview of Mass-Storage Structure, Disk Structure, Disk Scheduling.

***File System Interface*:** File Concepts, Access Methods, Directory and Disk Structure,

***File System Implementation*-** File system Structure, File system Implementation, Directory Implementation, Allocation Methods, Free-Space Management.

UNIT– V

Deadlocks:

System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Protection and Security:

Protection: Goals of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Access Control, Revocation of access rights,
Security: The Security problem, System and Network Threats.
CASESTUDY: The Linux Operating System:
History, Design Principles, Kernel Modules, Process Management.

Text Books :

1. Silberschatz, Galvin and Greg Gagne, Operating System Concepts, 9th edition, WILEY INDIA Edition.

Reference Books :

1. Operating System : Internals and Design principles, 5th Edition, Willam Stallings Prentice Hall of India.
2. Gagne[2003],[6thEdition],Operating System Concepts, John Wiley & Sons, Inc publishers.
3. Tanenbaum [2000],Modern Operating System, Pearson Education..

Question Paper Pattern:

Sessional Exam

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End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub- questions. i.e there will be two questions from each unit and the student should answer any one question

COMPUTER NETWORKS (CN)

IV Semester: CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS211	Professional Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	-	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand Network models and Physical layer Understand Data Communication Systems, Network models and its Protocols

CO2: Study the techniques used in data link layer.

CO3: Understand the routing strategies for an IP based networking infrastructure.

CO4: Study of congestion control and internetworking concepts.

CO5: Understand connection establishment and services provided by TCP and UDP

UNIT– I

Introduction: Data communications, Networks, Protocols and standards, The OSI Model – Layered architecture, Layers in OSI Model, TCP/IP Protocol Suite, Addressing – Physical addresses, Logical addresses, Port Addresses.

Physical layer and Transmission Media: Analog and digital – Analog and digital data, Analog and digital signals, Digital signals – Bit rate, Bit length, Transmission of digital signals, Transmission Impairments – Attenuation, Distortion and Noise, Performance – Bandwidth, Throughput, Latency, Jitter.

UNIT– II

Data Link Layer: Error detection – Introduction, Block coding – error detection, error correction, hamming distance and minimum hamming distance, CRC codes, Checksum. Framing, Flow and error control.

UNIT– III

Network layer: Design Issues: store-and-forward, services to transport layer, connection less and Connection oriented services, comparison of virtual circuits and datagram subnets.

Routing Algorithms: The optimality principle, shortest path routing, Flooding, Distance vector and Link state, Hierarchical, Broadcast and Multicast Routings.

UNIT– IV

Congestion Control: Principles, congestion prevention policies, congestion control in virtual circuits and datagram subnets, load shedding, jitter control.

Internetworking: Concatenated virtual circuits, connection less internetworking, tunnelling, Internet work routing, Fragmentation. The IP protocol, IP address, Internet Control protocols, Gateway routing protocols: OSPF, BGP.

UNIT– V

Transport Layer: UDP, TCP- service model, protocol, segment header, connection management, Transmission Policy, congestion control and timer management.

Application Layer: The DNS Name Space, Resource Records, Name Servers.

Text Books :

1. Behrouz A. Forouzan [2006][4th Edition], Data communications and Networking, MGH.
2. Andrew S. Tenenbaum [2007], [4th Edition], Computer Networks, Pearson Education.

Reference Books :

1. William Stallings ,Data and Computer Communications, Seventh Edition or Eighth Edition
2. An Engineering Approach to Computer Networks, S.Keshar, [II Edition], Pearson Education.
3. Computer Networking: A Top-Down Approach Featuring the Internet, James F, Keith W.Ross, [V Edition], Pearson Education.
4. Computer networks and internets, Douglas E Comer [6th Edition], Pearson Education.

Web References:

1. https://www.tutorialspoint.com/data_communication_computer_network/index.htm

Question Paper Pattern:

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End Exam

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DESIGN & ANALYSIS OF ALGORITHMS (DAA)

IV Semester: CSE						**Scheme: 2017**		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CS212	Professional Core	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
		3	**0**	**-**	**3**	**40**	**60**	**100**
Sessional Exam Duration: 2 Hrs						**End Exam Duration: 3 Hrs**		

Course Outcomes: At the end of the course students will be able to

CO1: Understand time, space complexities, notations, Divide and conquer technique to solve problems.

CO2: Understand greedy method to solve problems.

CO3: Understand Dynamic programming technique to solve problems.

CO4: Understand Backtracking and branch & bound techniques and solve problems.

CO5: Understand basic tree traversal and searching techniques and finding the lower bound for various applications

UNIT– I

Introduction: What is an Algorithm? Performance Analysis: Space &Time Complexities, Asymptotic notation, Probabilistic analysis, Amortized analysis.

Divide and Conquer: General method, Binary search, Finding Maximum and Minimum, Merge sort, Quick sort, Strassens Matrix Multiplication.

UNIT– II

Greedy Method : The General Method, Knapsack Problem, Tree Vertex splitting, Job Sequencing with Deadlines, Minimum-Cost Spanning Trees, Optimal Storage on Tapes, Optimal Merge Patterns, Single Source Shortest Paths.

UNIT– III

Dynamic Programming : The General Method, Multistage Graphs, All Pairs Shortest Paths, Optimal Binary Search Trees, String Editing problem, 0/1-Knapsack, Reliability Design, The Travelling Salesperson Problem.

UNIT– IV

Backtracking: The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring, and Hamiltonian Cycles.

Branch and Bound: The Method, 15 Puzzle problem, Travelling Salesperson.

UNIT– V

Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs, Bi-connected Components and DFS.

Lower Bound Theory: Comparison Trees, Oracles and Adversary Arguments, Techniques for Algebraic problems.

Text Books :

1. Ellis Horowitz, SartazSahni& Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Galgotia Publications Second Edition.

Reference Books :

1. Jon Kleinberg, Eva Tardos, Algorithm Design, Pearson Education Seventh Impression.

Question Paper Pattern:

Sessional Exam

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End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

SOFTWARE ENGINEERING (SE)

IV Semester: CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS213	Professional Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	-	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the phases of software development life cycle and Process models

CO2: Demonstrate Requirement Engineering process and change management

CO3: Understand the design concepts, design models, architectural styles and patterns

CO4: Explain White box testing and Black box testing techniques

CO5: Understand Risk Mitigation Monitoring Management plan, Software Quality Assurance activities and Quality standards

UNIT– I

Introduction To Software Engineering And Process Models: The Evolving role of software, Changing nature of software, Software myths.

Software Engineering: A Layered Technology, A Process Framework.

Process Models: The Waterfall model, Incremental process models, Evolutionary process models, The Unified process, Agile process models.

UNIT– II

***Software Requirement and Requirement Engineering Process*:** Functional and Non-functional requirements, User requirements, System requirements, The Software requirements document.

Requirement Engineering Process: Feasibility studies, Requirements elicitation and Analysis, Requirement validation, Requirement Management.

UNIT– III

Design: Design process and Design quality, Design concepts-Abstraction, Information Hiding, Functional Independence, Refactoring, Modularity, Refinement, Design Classes, Design Model.

Creating an Architectural Design: Software Architecture, Data Design- Data Design at architecture level, Data Design at component level, Architectural Styles & Patterns. Architectural design.

UNIT– IV

***Testing & Metrics*:** Testing Strategies-A Strategic approach to Software testing, Test strategies for Conventional software, White Box Testing- Basis Path Testing, Control Structure Testing, Black Box Testing, Validation Testing, System Testing, The art of Debugging.

Metrics for Process & Products: Software Measurement, Metrics for software quality.

UNIT– V

Risk Management: Risk Management- Reactive vs. Proactive risk strategies, Software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM plan.

Quality Management: Quality Management- Quality Concepts, Software quality assurance, Software reviews, Formal technical reviews, Statistical software quality assurance, Software reliability, The ISO 900 quality standards.

Text Books :

1. Roger S.Pressman [2005], [7th Edition], *Software Engineering, A Practitioner's Approach*, Mc Graw Hill, International Edition.
2. Sommerville [2008], [7th Edition], *Software Engineering*, Pearson education.

Reference Books :

1. K.K.Agarwal&Yogesh Singh [2008], *Software Engineering*, New Age International Publishers.
2. James F.Peters,Witoldpedecz,JohnWiely [2008], *Software Engineering-an Engineering approach*.
3. Software Engineering, Pankaj Jalote's , A Precise Approach, Wiley

Web References:

1. 1. https://www.tutorialspoint.com/software_engineering/software_engineering_tutorial.pdf
2. 2.http://www.niecdelhi.ac.in/uploads/Notes/btech/4sem/cse/21378403-Software-Engineering--K-Aggarwal-YogeshSingh-Full-Notes.pdf

Question Paper Pattern:

Sessional Exam

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End Exam

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ENVIRONMENTAL STUDIES (ES)

IV Semester: Common for CSE & ECE					Scheme : 2017			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
ML02	Mandatory	2	-	-	-	-	-	-
Sessional Exam Duration : -					End Exam Duration:-			

Course Outcomes : At the end of the course students will be able to

CO1: Apply the knowledge of environmental issues in his area of work. Appreciate the need for the conservation of Natural resources for sustainable development.

CO2: Understands the importance of Ecosystem and conservation of biodiversity

CO3: Understands the problems due to environmental pollution with remedial measures and issues related to environment.

CO4: Appreciate the disaster management in prevention of loss of life and property

CO5: Appreciate the use of IT & related technology to conserve environment & human health.

UNIT - I

Introduction to Environmental studies and Natural resources:

Definition, scope, importance and multidisciplinary nature of Environmental studies. Need for public awareness.

Energy resources-Growing energy needs non-renewable and renewable energy resources: Hydroelectric, solar, wind and nuclear energy resources. Water resources-Use and over exploitation of surface and ground water. Dams and its effects on forest and tribal people. Forest resources- uses of forest, deforestation causes and effects. Food resources- changes caused by agriculture and over grazing. Modern agriculture and its effects. Role of individual in conservation of natural resources.

UNIT - II

Concepts of ecosystem:

Structure and function of an ecosystem. Energy flow in an ecosystem (single channel energy flow model). Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features and functions of grasslands, desert, pond and ocean ecosystems.

UNIT - III

Biodiversity and its conservation:

Definition, levels of biodiversity. Values of biodiversity- consumptive, productive, social, ethical and ecological services. Hot spots of biodiversity. Biogeographical classification of India. Endangered and endemic species of India. Threats to biodiversity-Habitat loss, poaching of wild life and man-wild life conflict. Conservation strategies- In situ and ex situ conservation.

UNIT - IV

Environmental pollution:

Definition, causes, effects and control measures of air, soil,water and noise pollution. Disaster management-Floods. Earth quake, cyclone and landslides. Global warming, acid rains, ozone layer depletion. Waste management-Municipal solid waste. Role of an -individual in prevention of pollution.

UNIT - V

Social issues and the environment

Consumerism and waste products. From unsustainable development to sustainable development. Salient features of Air Act, water Act and Forest conservation Act. Process involved in the enforcement of Environmental legislation. Role of Information Technology in environment and human health.

Text books

1. C.P. Kaushik and Anubha Kaushik, " Environmental Studies" New Age International(p) Ltd., New Delhi
2. R.Rajagopalan " Environmental Studies", Oxford University press, Chennai
3. Y.Anjaneyulu " Introduction to Environmental sciences", BS Publications, Hyderabad

Reference books

1. Benny Joseph. "Environmental Studies" , Tata McGraw Hill, New Delhi.
2. Barucha Erach, "Environmental studies", Universities press.

BASIC ELECTRONICS LAB (BE (P))

IV Semester: CSE							Scheme:2017
Course Code	Hours/Week			Credits	Maximum Marks		
EC212	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
	0	0	2	1	50	50	100
End Exam Duration: 3 Hrs							

Course outcomes: Up on successful completion of this course, the student shall be able to

CO1: Study and analyze the operation of cathode-ray oscilloscope (CRO) for Sinusoidal,Triangular, Square wave forms and phase calculation using lissajous figures.

CO2: Plot the V-I characteristics of PN-Diode, Zener diode to understand their behavior and calculate cut-in voltage, breakdown voltage

CO3: Design half wave and full wave rectifiers with filters, calculate ripple factor and percentage of regulation, and plot the characteristics

CO4: Design Common Base(CB) and Common Emitter (CE) configuration and Characterize the current flow of a bipolar transistor in CB and CE configurations

CO5: Realize Boolean expression using logic gates and design Half adder and Full adder Circuit

CO6: Design and realize the truth tables for Multiplexer and Shift register

CO7: Study and analyze the basic operation of Operational Amplifier (OP-AMP-741)

List of Experiments

1. Study of Electronic equipment - CRO, CDS, and FG etc
2. Semiconductor Diode Characteristics (p-n diode and Zener diode)
3. Half Wave and Full wave Rectifiers
4. Transistor Characteristics – CE Configuration
5. Transistor Characteristics – CB Configuration
6. Verification of Logic Gates
7. Half Adder and Full Adder
8. Multiplexers and Decoders
9. Verification of Flip flops
10. Shift Register
11. Inverting and Non Inverting Amplifier
12. Summing and Difference Amplifier

OBJECT ORIENTED PROGRAMING LAB (OOP(P))

IV Semester: CSE					**Scheme: 2017**		
Course Code	**Hours/Week**			**Credit**	**Maximum Marks**		
CS209	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
	0	**0**	**2**	**1**	**50**	**50**	**100**

End Exam Duration: 3 Hrs

Course Outcomes: At the end of the course students will be able to

CO1: Implement class, object and constructor in java.

CO2: Develop programs using packages and Interfaces.

CO3: Perform operations on strings

CO4: Implement the concept of multithreading and file

CO5: Design applets with event handling mechanism

List of Experiments

1. Class, object, Constructor: Student details, complex number arithmetic operations, transpose of a matrix.
2. Inheritance: Multilevel, Hierarchical
3. Packages: Access protection
4. Interface: Multiple inheritance using interface
5. String handling: String class and its methods
6. Exception handling: built-in exceptions and custom exceptions
7. Multithreading: creating multiple thread using Thread class and Runnable interface
8. Files: Reading and writing.
9. AWT controls: Drawing various shapes and factorial of a number
10. Event handling: mouse events and keyboard events

Reference Books :

1. Herbert Schildt [2008], [5th Edition], The Complete Reference Java2, TATA McGraw-Hill.

SOFT SKILLS LAB (SS(P))

III/IV Semester : Common for all Branches				Scheme : 2017		
Course Code	**Hours/Week**			**Credits**	**Maximum Marks**	
HU204	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**TOTAL**
	0	**0**	**2**	**1**	**100**	**100**

Course Outcomes : At the end of the course students will be able to

CO1: Communicate effectively and enhance their interpersonal relationship building skills with renewed self confidence

CO2: Work together in teams and accomplish objectives in a cordial atmosphere

CO3: Face interviews, GDs and give presentations

CO4: Understand and develop the etiquette necessary to present themselves in a professional setting

CO5: Learn the Principles of Personal effectiveness

List of Activities

1. Ice breaking Activities, Principles of Time and Stress Management
2. Art of speaking
3. Art of writing - Essay / Picture / Story
4. Business etiquette - Telephone and email
5. Presentation Skills - Power point making
6. Group Discussion – Objectives and Skills tested in a GD, types of GD, Dos and don'ts & practice
7. Team work - Drama / Skit / Role play
8. Paper / Poster Presentation
9. Problem Solving by lateral thinking puzzles
10. Know your General Awareness / Knowledge – Quiz
11. Principles of Personal excellence
12. Interview Skills

Reference Books :

1. Stephen R. Covey, “The Seven Habits of Highly Effective People”, Pocket Books Publishers, London
2. Priyadarshani Patnaik, “Group Discussion and Interview Skills with VCD”, Foundation Books.
3. Sangeeta Sharma &Binod Mishra, “Communication Skills for Engineers and Scientists”, PHI Learning Private Limited.
4. Shiv Khera, “You Can Win”, MacMillan India Publishers, New Delhi
5. Campus Connect Portals - TCS - https://campuscommune.tcs.com; Infosys - http://campusconnect.infosys.com/

FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination

(Effective from 2017-2018)

CSE –V Semester **Scheme: 2017**

S. No	Course No.	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T/D	P	End Exam Marks	Internal Assessment Marks	Total Marks
I		**Theory**							
1.	EC313	Introduction to Microprocessors & Microcontrollers	3	3	0	0	60	40	100
2.	CS301	Data Mining	3	3	0	0	60	40	100
3.	CS303	Formal Languages and Automata Theory	3	3	0	0	60	40	100
4.	CS304	Web Technologies	3	3	0	0	60	40	100
5.		***Professional Elective-1***	***3***	***3***	***0***	***0***	***60***	***40***	***100***
6.		***Open Elective-1***	***3***	***3***	***0***	***0***	***60***	***40***	***100***
II		**Practical**							
7	CS302	Data Mining Lab	1	0	0	2	50	50	100
8.	CS305	Algorithms & Computer Networks Lab	1	0	0	2	50	50	100
9	CS306	Mini Project-1	***2***	***0***	***0***	***4***		***100***	***100***
		Total	**22**	**18**	**0**	**08**	**460**	**440**	**900**

FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination

(Effective from 2017-2018)

CSE – VI Semester **Scheme: 2017**

S. No	Course No.	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T/D	P	End Exam Marks	Internal Assessment Marks	Total Marks
I		**Theory**							
1.	CS315	Machine Learning	3	3	0	0	60	40	100
2.	CS317	Compiler Design	3	3	0	0	60	40	100
3.	CS319	Mobile Computing	3	3	0	0	60	40	100
4.		***Professional Elective-2***	***3***	***3***	***0***	***0***	***60***	***40***	***100***
5.		***Professional Elective-3***	***3***	***3***	***0***	***0***	***60***	***40***	***100***
6.		***Open Elective-2***	***3***	***3***	***0***	***0***	***60***	***40***	***100***
II		**Practical**							
7.	CS316	Machine Learning Lab	1	0	0	2	50	50	100
8.	CS318	Compiler Design Lab	1	0	0	2	50	50	100
		Total	**20**	**18**	**00**	**04**	**460**	**340**	**800**

INTRODUCTION TO MICROPROCESSORS & MICROCONTROLLERS (IMMC)

V Semester : CSE						Scheme : 2017		
Course Code	Course Category	Hours/Week			Credits	Maximum Marks		
EC313	Program Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration : 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes : At the end of the course the student will be able to

CO1: Understand the pin structure, architecture of 8086 microprocessor.

CO2: Understand the operations and internal block description l of 8086 microprocessor.

CO3: Apply the programming model of 8086 microprocessor for Assembly language programs.

CO4: Understand the pin structure, architecture and operations of 8051 microcontroller.

CO5: Apply the programming model of 8051micrcontrollerfor Assembly language programs.

UNIT I

Basics of Microprocessors: Block Diagram and Features of 8085 microprocessor, 8086 CPU architecture, Pin Diagram of 8086 microprocessor, comparison of 8085 and 8086 microprocessors.

UNIT II

8086 Operations: Segmented memory, Physical Memory Organization, Operating modes, Addressing modes, 8086 instruction set

UNIT III

Programming and Interfacing using 8086: Simple programs on Arithmetic operations, Sorting, Searching. Introduction to 8255 (Programmable Peripheral Interface) and it's CWR, 8251(USART), 8259 (Programmable Interrupt Controller).

UNIT IV

Introduction to 8051 Microcontroller: Pin Diagram, Architecture, Input / Output ports and circuits, External memory, counters and Timers, Serial data input/output, interrupts.

UNIT-V

8051 Programming: Addressing Modes, Instruction set. Basic Programming with 8051 Micro controller. Interfacing LEDs, Switches.

Text Books :

1. A K Ray, K M Bhurchandi, *Advanced Microprocessors and Peripherals*, 2nd Edition, Tata McGraw Hill Education Private Ltd, 2010.
2. Mazidi Muhammad Ali, Mazidi Janice Gillespie & McKinlay Rolin D, *The 8051 Microcontroller and Embedded Systems*, 2nd Edition, Pearson Education, 2008.

Reference Books :

1. John Uffenbeck, *The 8086/8088 Family: Design, Programming, and Interfacing*, 3rd Edition, Pearson Ed, 2006.
2. Barry B. Brey, *The Intel Microprocessors-Architecture, Programming and Interfacing*, 8th Edition, Princeton Hall India, 2009.
3. Kenneth J. Ayala, *The 8051 Microcontroller*, Penram International Publication Ltd, 2006.

4. Gaonkar Ramesh, *Microprocessors Architecture, Programming & Applications with 8085/8080A*, 5th Edition, Penram International Publication Ltd, 2010.

5. N. Senthil Kumar, M. Saravanan, S. Jeevananthan, *Microprocessors and Interfacing,* OUP India, 2012.

Web References:

1. www.nptel.onlinecourseac.in/.microprocessorsandmicrocontrollers

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each

End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

DATA MINING (DMG)

V Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS301	Program Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration:3 Hrs.		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the importance of data mining and the principles of business intelligence.

CO2: Organize and Prepare the data needed for data mining using pre-processing techniques.

CO3: Understand data mining classification technique using classifiers.

CO4: Implement Market based analysis using association rule mining

CO5: Analyze unsupervised clustering mining algorithms.

UNIT– I

Data Mining:

Introduction, What is Data Mining, Motivating Challenges, Data Mining Tasks, Types of Data, Similarity and Dissimilarity between Simple Attributes and Data Objects.

UNIT– II

Data Preprocessing:

Why Pre-process the Data?, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

UNIT– III

Classification:

Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, Building a decision tree, methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for Decision Tree Induction, Rule Base, Nearest-Neighbour Classifier, Bayes Theorem, using the Bayes theorem for classification, Naive Bayes Classifier.

UNIT– IV

Association Analysis:

Basic Concepts and Algorithms: Frequent Item Set generation, The Apriori Principle, Apriori Algorithm, Candidate Generation and Pruning, Rule Generation, Confidence-Based Pruning, Rule Generation with an example, FP-Growth Algorithm.

UNIT– V

Cluster Analysis:

What is Cluster Analysis, Types of Clustering, K-Means Algorithm, Agglomerative Hierarchical Clustering Algorithm, Key Issues in Hierarchical Clustering, DBSCAN Algorithm.

Text Books :

1. Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, Vipin Kumar, PEA
2. Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier,2006

Reference Books :

1. Data Warehousing Data Mining & OLAP, Alex Berson, Stephen Smith, TMH.
2. Data Mining Techniques, Arun K Pujari, Universities Press.

Web References:

1. https://onlinecourses.nptel.ac.in/noc18_cs14/
2. https://freevideolectures.com/course/3758/databases-data-mining

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 40 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

FORMAL LANGUAGES AND AUTOMATA THEORY (FLAT)

V Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS303	Program Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Out comes: At the end of the course students will be able to

CO1: Design the finite automata for a given regular language.

CO2: Understand the regular expressions and pumping lemma of regular languages.

CO3: Understand the regular grammar, context free grammar and pumping lemma for CFL.

CO4: Design push down automata and context free grammar for a given context free language.

CO5: Design the Turing machine for the given formal language.

UNIT– I

Finite Automata preliminaries: Strings, Alphabet, Language Operations, Finite State Machine definitions, Finite Automation Model, Acceptance of strings and languages, Non-deterministic Finite Automation, Equivalence between NFA and DFA, conversion of NFA into DFA, Equivalence between two FSM's, Minimization of FSM, Moore and Mealy machines, Applications of FA's.

UNIT– II

Regular Expressions and Regular Sets: Regular sets, Regular expressions, Identity rules, Manipulation of regular expression, Equivalence between RE and FA, Inter conversion, Pumping lemma for RE, Closure properties of regular sets.

UNIT– III

Grammar Formalism: Regular Grammar-Right linear grammar and left linear grammar, Equivalence between regular linear grammar and FA, inter-conversion between RE and RG, Derivation trees, Right most and left most derivation of strings.

Context Free Grammar: Context Free Grammar, Ambiguity in CFG, minimization of CFG, Chomsky Normal Form, Griebach Normal Form, pumping lemma of CFL.

UNIT– IV

Push Down Automata: Definition of the Pushdown Automaton, A Graphical Notation for PDA's, Instantaneous Descriptions of a PDA, The Languages of a PDA, Acceptance by Final State, Acceptance by Empty Stack, Equivalence of PDA's and CFG's, Properties of Context Free Languages.

UNIT– V

Turing Machines: Introduction to Turing Machines, Notation for the Turing Machine, Instantaneous Descriptions for the Turing Machines, Transition Diagrams for Turing Machines, The Language of a Turing Machine, Universal Turing machine, Halting problem of Turing Machine.

Text Books:

1. J.E.Hopcroft, Rajeev Motwani and J.D.Ullman, Introduction to Automata Theory Languages and Computation, Third edition, 2007, Pearson Education.
2. Mishra and Chandrashakaran, [2008], [Third Edition], Theory of computer sciences: Automata languages and computation, Third Edition, 2008, PHI.

Reference Books:

1. John C Martin, Introduction to languages and the theory of computation, Third edition, 2007, TMH.
2. Peter Linz, An Introduction to Formal Languages and Automata, Fourth edition, 2010, Narosa Book Distributors Pvt. Ltd.
3. Michael Sipser, Introduction to Theory of Computation, 3rd Edition, 2012, Cengage Learning.
4. Bernar M Moret, The Theory of Computation, First edition, 2002, Pearson Education.

Web References:

1. https://nptel.ac.in/courses/111103016/
2. https://www.tutorialspoint.com/automata_theory/

Question Paper Pattern:

Sessional Exam:

The question paper for Sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second Sessional exam. Question No 1, which carries 6 marks, contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

Note: JFLAP software is used to design the models of DFA, NFA, Moore machine, Mealy machine, PDA and TM.

WEB TECHNOLOGIES (WT)

V Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS304	Program Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Design a Web Page using Text Formatting Tags, Hyperlinks.

CO2: Develop a webpage with Images, Tables

CO3: Understand the concepts of CSS, Lists.

CO4: Design a web page using Frames, dynamic web pages using JavaScript

CO5: Design a Form using HTML Forms & Controls.

CO6: Understand the concepts of XML.

UNIT– I

HTML5: Overview of HTML5 and other web technologies, HTML5 and its essentials, Fundamentals of HTML5,Working with Text and organizing Text in HTML, Working with Links and URLs.

UNIT– II

Images: Working with Images, Image Maps, Creating Tables.
CSS: Overview of CSS, Backgrounds and Color Gradients in CSS, Fonts and Text Styles, List Styles, Table Layouts.

UNIT– III

***Frames*:** Creating Frames using CSS, Displaying Positioning and Floating an Element using CSS.
JavaScript*:* Overview of java script, Functions, Events, Java script Objects, Working with Browser Objects, Document Object, Document Object Model, Validation, Errors, Exception Handling in JavaScript.

UNIT– IV

Forms: What's a Form? What Controls are available? Creating a Form and adding HTML Controls, Submitting Data from forms, Customizing Controls in CSS.

UNIT– V

Working with Basics of XML: Comparing XML with HTML, Advantages and Disadvantages of XML, Structure of XML documents, Exploring XML parsers, Describing DTD and XML Schemas.

Text Books:

1. HTML5 Black Book,2nd Edition, Dreamtech Press,2016.

Reference Books:

1. Robert Pattinson, Beginners Guide for HTML and CSS Web Design and Web Development,2018
2. John P. Rhynes, HTML5 and CSS3 The Basics, Introduction for Beginners,2018.
3. Ikram-Hawramani, HTML & CSS for Complete Beginners: A Step by Step Guide to Learning HTML5 and CSS3, 2018
4. John Dean, Web Programming with HTML5, CSS, and JavaScript ,2018

Web References:

1. https://www.w3schools.com/Html
2. https://www.tutorialspoint.com/Html/index.htm

Question Paper Pattern:

Sessional Exam

The question paper for session examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No1 which carries 6 marks contains three short answer two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

Note:

1. Tools like Adobe Dreamweaver, Bootstrap can be used to create and manage websites.

DATA MINING LAB (DMG(P))

V Semester: B.Tech-CSE					Scheme: 2017		
Course Code	Hours/Week			Credits	Maximum Marks		
CS302	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
	0	0	2	1	50	50	100
Sessional Exam Duration: 2Hrs.					End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Learn to execute data mining tasks using a data mining toolkit WEKA.

CO2: Analyze Data preprocessing techniques on raw input data and process it for mining.

CO3: Demonstrate the classification techniques on large datasets.

CO4: Apply the working of algorithms for data mining tasks such as association rule mining, clustering.

List of Experiments

1. Introduction to WEKA and create an arff dataset.
2. Create a Weather Table with the help of Data Mining Tool WEKA.
3. Demonstration of preprocessing techniques to the training data set of Weather Table.
4. Write a Procedure to Normalize Weather Table data using Knowledge Flow.
5. Demonstrate Construction of Decision Tree for Weather data and classify it.
6. Write a procedure for Visualization of Weather Table.
7. Write a procedure in finding Association Rules for Buying Data.
8. Demonstration of Association rule process on dataset test.arff using apriori algorithm.
9. Write a procedure for Clustering Customer data using Simple K-Means Algorithm.
10. Write a procedure for Employee data using Make Density Based Cluster Algorithm.

References :

1. Introduction to Data Mining Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Pearson
2. http://www.cs.waikato.ac.nz/ml/weka/

ALGORITHMS AND COMPUTER NETWORKS LAB (ACN(P))

V Semester: B.Tech- CSE					Scheme: 2017		
Course Code	Hours/Week			Credits	Maximum Marks		
CS305	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
	0	0	2	1	50	50	100
Sessional Exam Duration:2 Hrs					End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Implement divide and conquer techniques.

CO2: Implement greedy method.

CO3: Implement dynamic programming and graph traversal techniques.

CO4: Implement the techniques used in data link layer.

CO5: Implement the routing algorithms.

List of Experiments

1. Merge sort using divide and conquer
2. Binary search using divide and conquer
3. Prim's algorithm using greedy method
4. 0/1 knapsack problem using dynamic programming
5. Depth first search
6. Cyclic Redundancy Code
7. Dijkstra's algorithm
8. Distance vector routing algorithm
9. Link state routing
10. Domain name server

Reference Books:

1. Behrouz A. Forouzan [2006] [4th Edition], Data communications and Networking, MGH.
2. Andrew S. Tenenbaum [2007], [4th Edition], Computer Networks, Pearson Education.

MACHINE LEARNING (ML)

VI Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS311	Program Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the machine learning concepts and the main steps in a typical machine learning project.

CO2: Build a digit image classifier on MNIST dataset.

CO3: Build a linear regression model using direct closed form equation and Gradient Descent approaches, polynomial regression model, softmax regression model.

CO4: Understand the core concepts and working of Support Vector Machines, Decision trees and CART training algorithm.

CO5: Understand popular ensemble methods-bagging and pasting, random forests, dimensionality reduction techniques-PCA, Kernel PCA and clustering algorithms-k-Means, DB Scan

UNIT– I

Machine Learning Landscape

Introduction, Types of Machine Learning Systems, Challenges, Testing and Validating

End-to-End Machine Learning Project

Working with Real data, Look at the big picture, Launch, Monitor and Maintain your system

UNIT– II

Classification

MNIST, Training a Binary Classifier, Performance measures, Multiclass classification, Error analysis, Multilabel classification, Multioutput classification

UNIT– III

Training Models

Linear Regression, Gradient Descent, Polynomial Regression, Learning Curves, Regularized Linear Models, Logistic Regression

UNIT– IV

Support Vector Machines

Linear SVM classification, Nonlinear SVM classification, SVM Regression

Decision Trees

Training and visualizing a decision tree, Making predictions, Estimating class probabilities, CART Training algorithm, Computational complexity, Gini Impurity or Entropy, Regularization Hyper parameters, Regression

UNIT– V

Ensemble Learning and Random Forests

Voting classifiers, Bagging and pasting, Random patches and Random subspaces, Random forests

Dimensionality Reduction

Curse of dimensionality, Main approaches for Dimensionality Reduction, PCA, Kernel PCA

Unsupervised Learning Techniques

Clustering algorithms - K-Means, DB Scan

Text Books:

1. Aurelian Geron, "Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to build Intelligent Systems", OReilly Publications, First Edition, 2017
2. Tom M.Mitchell, "Machine Learning", Mc Graw Hill Education, Indian Edition, 2013

Reference Books:

1. Oliver Theobald, "Machine Learning for Absolute Beginners", Second Edition, 2017
2. Ethem Alpaydin," Introduction to Machine Learning", The MITPress, Third Edition, 2014
3. Miroslav Kubat, "An Introduction to Machine Learning" , Springer, 2017

Web References:

1. *https://www.coursera.org/learn/python-machine-learning* offered by University of Michigan
2. *https://scikit-learn.org/stable/*
3. *https://github.com/ageron/handson-ml.*
4. *https://www.coursera.org/learn/python-data-analysis?specialization=data-science-python*
5. *https://www.coursera.org/learn/python-plotting?specialization=data-science-python*
6. *http://learnpython.org/*

Question Paper Pattern:

Sessional Exam:

The question paper for Sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second Sessional exam. Question No 1, which carries 6 marks, contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

COMPILER DESIGN (CD)

VI Semester: B.Tech-CSE						Scheme: 2017		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
CS313	Program Core	3	0	0	3	**40**	**60**	**100**
Sessional Exam Duration:2 Hrs						**End Exam Duration:3 Hrs**		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the phases of compiler and compiler construction tools.

CO2: Identify tokens in the source program using lexical analyzer technique.

CO3: Develop top-down and bottom-up parsers for the given grammar.

CO4: Develop type checking semantic rules using synthesized and inherited attributes.

CO5: Develop optimized intermediate code using code optimization techniques.

CO6: Understand target code generation using flow graph and DAG representations of input source code.

UNIT– I

Compilers:

Basic function of Language translator, differences between compiler and interpreter, bootstrapping, logical phases of a compiler, differences between pass and phase, grouping the phases into passes, compiler construction tools.

Lexical Analysis:

The role of lexical analyzer, input buffering, specifications of tokens, recognition of tokens, a language for specifying lexical analyzers, LEX tool.

UNIT– II

Syntax Analysis:

Role of parser, top down parsing, recursive decent parsing, predictive parsers, non-recursive predictive parsing, bottom up parsing, operator precedence parsing, LR parsers, using ambiguous grammars, YACC parser generator.

UNIT– III

Semantic Analysis:

Typical semantic errors, type checking, type conversions, specification of a simple type checker, equivalence of type expressions, overloading of functions and operators, polymorphic functions, strategies of storage allocation: static, dynamic and heap.

Syntax-Directed Translation:

Syntax-Directed Definitions, Construction of Syntax Trees, Bottom-Up Evaluation of S-Attributed Definitions, L-Attributed Definitions, Top Down Translation, Bottom-Up Evaluation of Inherited Attributes.

UNIT– IV

Intermediate Code Generation:

Intermediate code languages, three address code, types of three address code, syntax directed translation into three address code, implementations of three address statements - quadruples, triples, indirect triples, Boolean expressions, back patching.

Code Optimization:

Introduction to code optimization, principles sources of optimization, optimization of basic blocks, peephole optimization.

UNIT– V

Code Generation:

Issues in the design of code generator, the target machine, basic blocks and flow graphs, next use information, a simple code generator, DAG representation of basic blocks, generating code from DAGs.

Text Books :

1. Alfred V.Aho, Ravi Sethi, Jeffrey and D.Ullman, Compilers Principles, Techniques and tools, Pearson edition, 2014

Reference Books :

1. KVN Sunitha, Compiler Construction, Pearson, 2013.
2. Keith D Cooper & Linda Torczon, Engineering a Compiler, Second Edition, MK (Morgan Kaufmann), Elsevier, 2008.
3. Parag H Dave, Himanshu B Dave, Compiler Principles and Practice, Pearson, 2012.
4. Sandeep Saxena, Rajkumar Singh Rathore, Compiler Design, S Chand Publications, 2013.

Web References:

1. https://nptel.ac.in/courses/106104072/
2. https://www.geeksforgeeks.org/compiler-design-tutorials/
3. https://www.tutorialspoint.com/compiler_design/
4. https://www.javatpoint.com/compiler-tutorial

Question Paper Pattern:

Sessional Exam:

The question paper for Sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second Sessional exam. Question No 1, which carries 6 marks, contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

Note:

1. The modern tool “Flex” can be used to demonstrate Lex and YACC topics in UNIT-1 and UNIT-2 respectively.

MOBILE COMPUTING (MCP)

VI Semester: B.Tech-CSE						Scheme: 2017		
CourseCode	Category	Hours/Week			Credits	Maximum Marks		
CS315	Program Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the basic concepts of wireless communication & mobile computing.

CO2: Understand the wireless medium access controlling mechanisms and GSM.

CO3: Understand the WLAN System Architecture, Protocol Architecture, Physical Layer.

CO4: Acquiring knowledge on the structure & concepts of Mobile IP.

CO5: Understand the Traditional TCP and Classical Improvements of TCP.

UNIT– I

Wireless transmission: Frequencies for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation (ASK, FSK, PSK) Spread spectrum, Cellular systems.

UNIT– II

Medium access control: Motivation for a Specialized MAC, SDMA, FDMA, TDMA (Fixed TDM, classical Aloha, Slotted Aloha, CSMA), CDMA, Comparison of S/T/F/CDMA.

GSM: Mobile services, System Architecture, Radio interface, Protocols, Localization and calling, Handover.

UNIT– III

Wireless LAN: Infrared Vs Radio Transmission, Infra Red and ad-hoc network,

IEEE 802.11: System architecture, Protocol architecture, Physical layer, Medium access control layer, MAC management.

UNIT– IV

Mobile IP: Goals & requirements, Entities and terminology, IP Packet delivery, Agent discovery, Registration, Tunnelling & Encapsulation, Optimizations, Reverse tunneling, IPv6, Dynamic host Configuration protocol.

UNIT– V

Traditional TCP: Congestion control, Slow start, Fast retransmit/fast recovery, implications of mobility, Classical TCP improvements.

Text Books :

1. Jochen Schiller [2008], [Second Edition], *Mobile Communications*, Low price edition, Pearson

Reference Books :

1. Talukder [2008], *Mobile Computing: Technology, Applications & service creation*, TMH.

Web References:

1. https://sgar91.files.wordpress.com/2011/10/mobile_communications_schiller_2e.pdf
2. https://www.pearson.com/us/higher-education/program/Schiller-Mobile-Communications-2nd-

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second sessional exam. Question No1which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions i.e. there will be two questions from each unit and the student should answer any one question.

MEACHINE LEARNING LAB (ML(P))

VI Semester: B.Tech- CSE					Scheme: 2017		
Course Code	Hours/Week			Credits	Maximum Marks		
CS312	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
	0	0	2	1	50	50	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs	

Course Outcomes: At the end of the course students will be able to

CO1: Build a machine learning model for a given data set.

CO2: Use Scikit-Learn toolkit for building machine learning models

List of Experiments

1. Scikit-Learn -- Practice
2. Build a digit image classifier on MNIST dataset.
3. Build a linear Regression model for a given data set
4. Support Vector machines
5. Training and Visualizing a decision tree
6. Ensemble Learning
7. Random Forests
8. Dimensionality Reduction Technique - PCA
9. Clustering algorithm – k-Means

Reference Books :

1. Aurelian Geron, "Hands-On Machine Learning with Scikit-Learn and TensorFlow : Concepts,
2. Danish Haroon, "Python Machine Learning Case Studies" , Apress
3. Peter Harrington, "Machine Learning in Action", Manning Publications, 2012

COMPILER DESIGN LAB (CD(P))

VI Semester: B.Tech- CSE					Scheme: 2017		
Course Code	Hours/Week			Credits	Maximum Marks		
CS314	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
	0	0	2	1	50	50	100
Sessional Exam Duration:2 Hrs					End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Implement DFAs, LA and Parser.

CO2: Implement Top Down and Bottom up parsing methods.

CO3: Design a Type checking system.

CO4: Construct DAG, Code generation and Code optimization.

List of Experiments

1. Implementation of Deterministic finite automata (DFAs).
2. Implementation of Symbol Table.
3. Lexical analyzer using Lex tool.
4. Yacc program to recognize a valid arithmetic expression.
5. First and Follow sets of a given grammar.
6. Implement Shift reduce parsing.
7. Operator precedence parsing.
8. Implement Type checking system.
9. Stack storage allocation technique.
10. Construction of Directed Acyclic Graphs(DAGs).
11. Construction of Code Generation from Three Address Code.
12. Implementation of Code Optimization techniques.

Additional Experiments

1. Elimination of Left Recursion of a Grammar.
2. Find Left factor of a Grammar.
3. Construct a Parse Tree for a String.
4. Implementation of Non-Recursive predictive parsing.
5. Construct a parsing table.

Reference Books :

1. Alfred V. Aho,Ravi Sethi, J.D.Ullman,[2nd Edition],Compilers principles techniques and tools, Pearson Education, 2009.

FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination

(Effective from 2017-2018)

CSE – VII Semester **Scheme: 2017**

S. No	Course No.	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T/D	P	End Exam Marks	Internal Assessment Marks	Total Marks
I		**Theory**							
1.	CS401	Network Security and Cryptography	3	3	0	0	60	40	100
2.	CS403	Big Data Analytics	3	3	0	0	60	40	100
3.	CS405	Software Project Management	3	3	0	0	60	40	100
4.		***Professional Elective - 4***	***3***	***3***	***0***	***0***	***60***	***40***	***100***
5.		***Open Elective-3***	***3***	***3***	***0***	***0***	***60***	***40***	***100***
6.		***Open Elective-4***	***3***	***3***	***0***	***0***	***60***	***40***	***100***
II		**Practical**							
7.	CS402	Network Security and Cryptography Lab	1	0	0	2	50	50	100
8.	CS404	Big Data Analytics Lab	1	0	0	2	50	50	100
9.	CS406	***Mini Project -2***	***2***			***4***		***100***	***100***
		Total	**22**	**18**	**00**	**08**	**460**	**440**	**900**

FOUR YEAR B.TECH. DEGREE COURSE

Scheme of Instruction and Examination

(Effective from 2017-2018)

CSE – VIII Semester **Scheme: 2017**

S. No	Course No.	Course Title	Credits	Scheme of Instruction periods/week			Scheme of Examination Maximum Marks		
				L	T/D	P	End Exam Marks	Internal Assessment Marks	Total Marks
I		**Theory**							
1.		***Professional Elective - 5***	***3***	***3***	***0***	***0***	***60***	***40***	***100***
2.		***Professional Elective – 6***	***3***	***3***	***0***	***0***	***60***	***40***	***100***
II		**Practical**							
3.	CS417	***Project Work***	***6***	***0***	***0***	***12***	***50***	***50***	***100***
		Total	**12**	**6**	**0**	**12**	**170**	**130**	**300**
OR									
I	CS426	***Internship***	***6***	***0***	***0***	***0***	***0***	***100***	***100***
II.	CS417	***Project Work***	***6***	***0***	***0***	***12***	***50***	***50***	***100***
		Total	**12**	**6**	**0**	**12**	**50**	**150**	**200**

NETWORK SECURITY AND CRYPTOGRAPHY (NSC)

VII Semester: B.Tech-CSE					Scheme: 2017			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS401	Program Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs					End Exam Duration:3 Hrs			

Course Outcomes: At the end of the course students will be able to

CO1: Illustrate the concepts and principles of computer network security.

CO2: Understand various classical encryption techniques and block cipher structure.

CO3: Analyze advanced encryption standard.

CO4: Understand block cipher operations.

CO5: Explain various asymmetric ciphers.

CO6: Understand cryptographic hash functions and digital signatures.

UNIT– I

Introduction to Security concepts

Computer security concepts, OSI Security Architecture, Security attacks, Security services, Security mechanisms, Fundamental security design principles, A model for Network Security.

Number Theory

Euclidean Algorithm, Modular Arithmetic, Fermat's and Euler's Theorem, Testing for primality.

UNIT– II

Symmetric Ciphers

Classical Encryption Techniques: Symmetric cipher model, Substitution techniques, Transposition techniques, Steganography.

Block Ciphers and DES

Traditional block cipher structure, Data Encryption Standard, DES Example, Strength of DES, Block cipher design principles.

UNIT– III

Advanced Encryption Standard

AES Structure, AES transformation functions, AES Key Expansion, AES Example, AES Implementation.

Block Cipher Operation

Multiple Encryption and Triple DES, Electronic codebook, Cipher Block Chaining Mode, Cipher feedback mode, output feedback mode.

UNIT– IV

Asymmetric Ciphers and Public key cryptosystems

Public-Key Cryptography and RSA: Principles of Public-key cryptosystems, RSA Algorithm. Diffie-Hellman Key Exchange, Elgamal Cryptographic systems.

UNIT– V

Cryptographic Hash Functions

Applications of cryptographic hash functions, Hash functions based on cipher block chaining, SHA.

Message Authentication codes:

Requirements, Message authentication functions, security of MACs.

Digital Signatures

Digital Signature requirements, Elgamal Digital Signature, Schnorr Digital Signature scheme.

Text Books :

1. William Stallings, [7th Edition], Cryptography and Network Security, Pearson.
2. Behrouz A. Forouzan, D Mukhopadhayay, [2nd Edition], Cryptography and Network Security, MC Graw Hill

Reference Books :

1. Eric Cole, Dr. Ronald Kurtz and James W. Conley, Network Security Bible, Wiley Publishers, 2009
2. Bruce C.Berndt, Number Theory in the Spirit of Ramanujan‖, University Press
3. V.K. Jain, Cryptography and Network Security, Khanna Publishing House.
4. Atul Kahate, Cryptography and Network Security, TMH

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second sessional exam. Question No.1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER / OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions .i.e. there will be two questions from each unit and the student should answer any one question.

BIG DATA ANALYTICS (BDA)

VII Semester: B.Tech CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS403	Program Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	-	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course, the students will be able to

CO1: Understand the basics of Big Data Analytics,Hadoop.

CO2: Design Map Reduce programs for a given problem.

CO3: Write Pig Scripts on Hadoop that works on large datasets.

CO4: Perform Data Querying Operations using Apache Hive.

CO5: Implement Data Management using NoSQL Databases.

UNIT– I

Big Data Analytics:

What is Big Data Analytics, why this Sudden Hype Around Big Data Analytics? Classification of Analytics, Top Challenges Facing Big Data, Few Top Analytics Tools.

Introduction to Hadoop:

Introducing Hadoop, HDFS, HDFS Commands, Processing Data with Hadoop,Managing Resources and Applications with Hadoop YARN, Interacting with Hadoop EcoSystem.

UNIT– II

Understanding *Map Reduce & YARN:*

The Map Reduce Framework Concept, Developing Simple Map Reduce Application,Points to consider While Desining Map Reduce, YARN Background,YARN Architecture,Working of YARN.

UNIT– III

Analyzing Data with Pig:

Introducing PIG, Running PIG, Getting started with pig Latin, Working with operators in pig, Debugging pig.

UNIT– IV

Understanding HIVE:

Introducing Hive,Hive Services, Built in functions in Hive,Hive DDL,Data Manipulation in Hive.

UNIT– V

NoSQL Data Management:

Introduction to NoSQL, Characteristics of NoSQL, Types of NoSQL Data Models,Schema-less Databases.

Text Books:

1. Big Data Black Book: Covers Hadoop 2, Map Reduce, Hive,YARN, Pig, R and Data Visualization by DreamTech,2015.
2. Big Data and Analytics by Seema Acharya,Wiley Publication,2015.

Reference Books:

1. Data Science & Big Data Analytics: Discovering, Analyzing, Presenting Data Visualizing.
2. Hadoop: The Definitive Guide, 3rd Edition , By Tom White , O'reilly Media
3. Big Data Now: 2012 Edition Publisher: O'Reilly Media.
4. Too Big to Ignore: The Business Case for Big Data (Wiley and SAS Business Series) By Phil Simon, Wiley 1e.

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub- questions. i.e there will be two questions from each unit and the student should answer any one question

Note:

1. Cloudera environment or Hadoop can be used to demonstrate various Hadoop Ecosystem for all the units.
2. Apache Hadoop is open source software for analyzing Big data. This is applicable for UNIT-I.
3. Map Reduce Programs are designed for data processing correspondingly in UNIT-II.
4. Apache pig is a tool used for data processing applicable for UNIT-III.
5. Apache Hive gives SQL like Interface to Query Data in UNIT-IV
6. Analysis type of questions can be given for Assignment from UNIT-II and UNIT-III.

SOFTWARE PROJECT MANAGEMENT (SPM)

VII Semester: B.Tech- CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS405	Program Core	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course, students will be able to

CO1: Define the purpose of project management and programme management.

CO2: Discuss project planning and process models.

CO3: Estimate effort of software project using effort estimation techniques.

CO4: Describe risk categories and steps to monitor, control the project.

CO5: Understand the importance of team work and software quality.

UNIT– I

Introduction to Software Project Management: What is a project, Activities covered by Software Project Management, Plans Methods and Methodologies, Ways of categorizing software projects, Stakeholders, Setting Objectives, The Business Case, Project success and failure, What is Management and Management control, Traditional and Modern Project Management Practices.

Project Evaluation and Programme Management: A Business Case, Project Portfolio Management, Evaluation of individual projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme Management, Strategic Programme Management, Creating a Programme, Aids to programme management, Benefits Management.

UNIT– II

An overview of Project Planning: Introduction to Step Wise Project Planning

Selection of an Appropriate Project Approach: Choosing Methodologies and Technologies, Software Processes and Process Models, The Waterfall Model, The Spiral Model, Software Prototyping, Incremental Delivery, Rapid Application Development, Agile Methods, Extreme Programming, Scrum, Managing Iterative Processes, Selecting the Most Appropriate Process Model.

UNIT– III

Software Effort Estimation: Introduction, Where are Estimates done, Problems with Over and Under estimates, The basis for Software Estimating, Software Effort Estimation Techniques, Estimation by Analogy, Albrecht Function Point Analysis, Function Points Mark II, COSMIC Full Function Points, COCOMO II: A Parametric Productivity Model, Staffing Pattern, Effect of Schedule Compression, Caper Jones Estimating Rules of Thumb.

UNIT– IV

Risk Management: Risk, Categories of Risk, A Framework for dealing with Risk, Risk Identification, Risk Assessment, Risk Planning, Risk Management, Evaluating Risks to the Schedule, Applying the PERT Technique.

Monitoring and Control: Creating the Framework, Collecting the Data, Review, Project Termination Review, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Prioritizing Monitoring, Getting the Project Back to Target, Change Control, Software Configuration Management.

UNIT– V

Working in Teams: Introduction, Becoming a Team, Decision Making, Organization and Team Structures, Coordination Dependencies, Dispersed and Virtual Teams, Communication Genres, Communication Plans, Leadership.

Software Quality: The place of Software Quality in Project Planning, Importance of Software Quality, Defining Software Quality, ISO 9126, Product and Process Metrics, Product versus Process Quality Management, Quality Management Systems, Process Capability Models, Techniques to help enhance Software Quality.

Text Books :

1. Software Project Management, Bob Hughes, Mike Cotterell & Rajib Mall, Fifth edition, Tata McGraw Hill Education (India) Private Limited, 2011.
2. Software Project Management, Walker Royce, Pearson Education, 2012.

Reference Books :

1. Software Project Management, S.A.Kelkar, Second Edition, PHI, 2011.
2. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
3. The art of Project Management, Scott Berkun, O'Reilly, 2005.
4. Software Project Management in Practice, Pankaj Jalote, Pearson Education, 2002.

Web References:

1. https://www.tutorialspoint.com/software_engineering/software_project_management.htm
2. https://en.wikipedia.org/wiki/Software_project_management

Question Paper Pattern:

Sessional Exam

The question paper for sessional examinations for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question paper contains six questions. Question 1 contains 5 short answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions i.e there will be two questions from each unit and the student should answer any one question.

Note:

1. Give an assignment on how to select the most appropriate process model for a given project from UNIT – II.
2. Solve problems and give assignment on effort estimation techniques from UNIT-III.
3. Form teams and assign small projects to take up as a team from UNIT-V.

NETWORK SECURITY AND CRYPTOGRAPHY LAB (NSC (P))

VII Semester: B.Tech-CSE					Scheme: 2017		
Course Code	Hours/Week			Credits	Maximum Marks		
CS402	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
	0	0	2	1	50	50	100
Sessional Exam Duration:2 Hrs					End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Perform basic concepts from number theory.

CO2: Implementation of encryption and decryption using substitution techniques.

CO3: Perform encryption and decryption using transposition techniques.

CO4: Implementation of encryption and decryption using DES and RSA algorithms.

CO5: Develop programs for various public key cryptosystems.

List of Experiments

1. Implementation of basic Euclidean algorithm.
2. Perform Fermat's primality test.
3. Encrypt and decrypt a message using Caesar cipher
4. Encrypt and decrypt a message using Hill cipher
5. Encrypt & decrypt a message using Transposition Cipher
6. Implementation of DES algorithm
7. Implementation of RSA algorithm
8. Perform Diffie-Hellman Key Exchange
9. Implementation of Elgamal Cryptographic system

Reference Books :

1. William Stallings, [7th Edition], Cryptography and Network Security, Pearson.
2. Behrouz A. Forouzan, D Mukhopadhayay, [2nd Edition], Cryptography and Network Security, MC Graw Hill.

BIG DATA ANALYTICS LAB (BDA(P))

VII Semester: B.Tech- CSE					**Scheme: 2017**		
Course Code	**Hours/Week**			**Credits**	**Maximum Marks**		
CS404	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
	0	0	2	1	**50**	**50**	**100**
Sessional Exam Duration: 2Hrs.					**End Exam Duration:3Hrs**		

Course Outcomes: At the end of the course students will be able to

CO1: Demonstrate Hadoop Commands in Ubuntu environment.

CO2: Design Map Reduce Programs to different problems.

CO3: Implement Pig on Hadoop Framework and perform basic operations.

CO4: Perform DDL operations using Hive on Hadoop.

List of Experiments

1. Perform Hadoop Setup in Local and Pseudo mode and monitor through Web Based UI.
2. Implementation of Hadoop Shell Commands on files.
3. Implementation of word count Example using Hadoop Map Reduce.
4. Write a Map Reduce Program that works on Gutenberg data.
5. Write a Map Reduce Program that mines weather data.
6. Write Pig Latin Scripts on Describe, for each and order by operator.
7. Write Pig Latin scripts to perform set and sort operation.
8. Perform DDL Operations on Hive.
9. Implementation of Data Management using NoSQL Databases.

Reference Books :

1.Big and Hadoop Learn by examples by Mayank Bhushan, BPB Publications, First Edition ,2018

Open Electives 1:

S.No	Course No.	Course Name	Offered by the Department
1.	OE301	Artificial Intelligence & Expert Systems	CSE
2.	OE302	Introduction to Information Systems	CSE
3.	OE303	Web Development Programming	CSE
4.	OE304	Introduction to Cyber Security	CSE
5.	OE305	Internet of Things	ECE
6.	OE306	Nano Technology	ECE
7.	OE307	Remote Sensing & GIS	CE
8.	OE308	Optimization Techniques	ME
9.	OE309	Renewable Energy Systems	EEE

Open Electives 2:

S.No	Course No.	Course Name	Offered by the Department
1.	OE310	Object Oriented Programming through JAVA	CSE
2.	OE311	Ethical Hacking	CSE
3.	OE312	Principles of Programming Languages	CSE
4.	OE313	Advanced Information Systems	CSE
5.	OE314	Scientific Programming with Python	CSE
6.	OE315	Fuzzy Logic & Neural Networks	ECE
7.	OE316	Building Information Modeling	CE
8.	OE317	Product Lifecycle Management	ME
9.	OE318	Simulation of Engineering Systems	EEE

Open Electives 3: (Department Emerging Technologies)

S.No	Course No.	Course Name
1.	CS411	Data Science with R
2.	CS412	Internet Protocols
3.	CS413	Dot Net Technologies

Open Electives 4: (Department Emerging Technologies)

S.No	Course No.	Course Name
1.	CS414	Natural Language Processing
2.	CS415	Human Computer Interaction
3.	CS416	Software Quality and Testing

Professional Electives-1

S.No	Course No.	Course Name
1.	CS307	Advanced Computer Architecture
2.	CS308	Artificial Intelligence
3.	CS309	Computer Graphics
4.	CS310	Mobile Application Development

Professional Electives-2

S.No	Course No.	Course Name
1.	CS316	Distributed Systems
2.	CS317	Multimedia and Animation
3.	CS318	Service Oriented Architecture & Web Services
4.	CS319	Pattern Recognition

Professional Electives-3

S.No	Course No.	Course Name
1.	CS320	Design Patterns
2.	CS321	Advanced Database Management Systems
3.	CS322	Soft Computing
4.	CS323	Computer Simulation and Modelling

Professional Electives-4

S.No	Course No.	Course Name
1.	CS407	Ad hoc and Sensor Networks
2.	CS408	Parallel and Distributed Algorithms
3.	CS409	Cloud Computing
4.	CS410	Computer Vision

Professional Electives-5

S.No.	Course No.	Course Name
1.	CS418	Introduction to Block Chain Technologies
2.	CS419	Wireless Networks
3.	CS420	Real Time Systems
4.	CS421	Deep Learning

Professional Electives-6

S.No.	Course No.	Course Name
1.	CS422	Digital Forensics
2.	CS423	High Performance Computing
3.	CS424	Image and Video Processing
4.	CS425	Embedded Systems

ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS (AIES)

V Semester: B.Tech					Scheme: 2017			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
OE301	Open Elective - 1	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs					End Exam Duration:3 Hrs			

Course Outcomes: At the end of the course students will be able to

CO1: Understand how to formulate an efficient problem state space for a problem

CO2: Discuss how search strategies will find solutions to problems by systematically generating new states and testing them against goals

CO3: Apply Hill-climbing, simulated annealing, Local Beam Search, Genetic Algorithms (Local search problems) for Agent's Problems

CO4: Describes how to solve unpredictability, contingencies of agent's problem-solving process, in which the agents' GAME goals are in conflict

CO5: Understand the features and working of Expert System.

UNIT– I

Introduction: What Is AI?, The Foundations of Artificial Intelligence

Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, And the Structure of Agents.

Solving Problems by Searching: Problem-Solving Agents, Example Problems, Searching for Solutions

UNIT– II

***Uninformed Search Strategies*:** BFS, DFS, Depth –limited search, IDA, Bidirectional search

Informed (Heuristic) Search Strategies- Greedy best-first search, A* search, Memory-bounded heuristic search, Learning to search better. Heuristic Functions.

UNIT– III

Beyond Classical Search: Local Search Algorithms and Optimization Problems, Local Search In Continuous Spaces, Searching With Partial Observations. Searching with Nondeterministic Actions

UNIT– IV

Adversarial Search: Games, Optimal Decisions In Games, Alpha—Beta Pruning

Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation: Inference In Csps, Backtracking Search For Csps, Local Search For Csps, The Structure Of Problems

UNIT– V

Introduction to Expert System: What are Expert Systems, Features of Expert system, Features of good expert system, Role of human in Expert system, Expert system organization, Difference between expert system and conventional program, Basic activities of expert system and the areas in which they solve problems, Prospector system features, working.

Text Books:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Third Edition, 2010. Pearson Education.
2. Donald A.Water man," A Guide to expert systems", Addison Wesley publishing company.

Reference Books:

1. Elaine Richie Kevin Knight [2008], [3rd Edition], Artificial Intelligence, TMH

Web References:

1. https://onlinecourses.nptel.ac.in/noc18_cs51
2. https://www.geeksforgeeks.org/artificial-intelligence-an-introduction/
3. https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_expert_systems.htm

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question.

INTRODUCTION TO INFORMATION SYSTEMS (IIS)

V Semester: B.Tech						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
OE302	Open Elective - 1	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the concepts of Computer architecture and functionalities of System software

CO2: Understand the page replacement and CPU Scheduling Algorithms

CO3: Understand the phases of software development life cycle and process models.

CO4: Design ER model for real life scenarios

CO5: Apply SQL commands to create, update, modify and retrieve data from the data bases.

CO6: Apply normalization techniques to normalize the database.

UNIT– I

Fundamentals of Computers & Computer Architecture:

Introduction, Organization of a small computer, Central Processing Unit, Execution cycle, Instruction categories, measure of CPU performance, Memory, Input/output devices, BUS, addressing modes

System Software:

Assemblers, Loaders and linkers, Compilers and interpreters.

UNIT– II

Operating System:

Introduction, Memory management schemes, Page replacement algorithms, Process management, CPU scheduling algorithms.

Software engineering:

Software engineering: Introduction to Software engineering, Life cycle of a software project, software Development models.

UNIT– III

Relational Database Management System:

Introduction to DBMS, the database technology, data models, Database Users.

***Entity Relationship (E-R) Modelling*:**

Introduction, Notations, Modelling E-R Diagrams, Case Studies, Merits and Demerits of E-R modelling.

UNIT– IV

Structured Query Language (SQL):

Introduction to SQL, Data types, Data Definition language commands, Data Manipulation Language Commands and Data control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectives – AND, OR, Range Search, Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate Functions, Join Operations.

UNIT– V

Normalization:

Introduction, Need for Normalization, Process of Normalization, Types of Normal Forms (1 NF, 2 NF, 3 NF & BCNF), Merits and Demerits of Normalization.

Text Books:

1. Campus Connect Foundation Program – Computer Hardware and System Software Concepts, Programming Fundamentals- Vol. – 1, INFOSYS.

2.Campus Connect Foundation Program – Relational Database Management System, Client Server Concepts, Introduction to Web Technologies - Vol. – 4, INFOSYS

3. Henry F. Korth & Abraham Silberschatz, - Data Base System Concepts, 5th Edition, 2005, Mc Graw ill

Reference Books:

1. M. Morris Mano [2011], [3 rd Edition], Computer system architecture, Pearson Education, 2011
2. Sommerville [2008], [7th Edition], Software Engineering, Pearson education.
3. Raghu Ramakrishna and Johannes Gehrke [2003], [3rd Edition], Data Base Management Systems, TATA Mc GrawHil
4. Tanenbaum [2000], Modern Operating System, Pearson Education.

Web References:

1. https://www.w3schools.com/sql/
2. https://www.geeksforgeeks.org/dbms/
3. https://www.tutorialride.com/software-engineering/software-engineering-tutorial.htm

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second sessional exam. Question No.1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER / OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

WEB DEVELOPMENT PROGRAMMING (WDP)

V Semester: B.Tech						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
OE303	Open Elective - 1	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the fundamental concepts of web designing.

CO2: Design a static web page using HTML tags and attributes.

CO3: Develop web pages using HTML and Cascading Styles sheets.

CO4: Understand the concepts of server side programming.

CO5: Create dynamic and interactive websites using database connection.

UNIT– I

Web Technology Fundamentals: Introduction to the Web, Web servers and Clients, Resources, URL and its Anatomy, Message Format, Persistent and Non-persistent connections, Web Caching, Proxy, Java and the Net, Java Network Classes and Interfaces, Looking up Internet Address.

UNIT– II

HTML: HTML and its Flavors, HTML basics, Elements, Attributes and Tags, Basic Tags, Advanced Tags, Frames, Images, Meta tag, Planning of Web page, Model and Structure for a Website, Designing Web pages, Multimedia content.

UNIT– III

Cascading style sheets: Advantages, Adding CSS, Browser compatibility, CSS and page layout, Selectors.

UNIT– IV

Server side programming: Server-side Java, Advantages over Applets, Servlet alternatives, Servlet strengths, Servlet architecture, Servlet life cycle, Generic and HTTP Servelet, First servlet, Passing parameters to servlets, Retrieving parameters, Server-side include, Cookies, Filters, Problems with servlet, Security issues, JSP and HTTP, JSP Engines, How JSP works, JSP and Servlet, Anatomy of a JSP page, JSP syntax, JSP components.

UNIT– V

Database Connectivity: Database connectivity, JDBC drivers, Basic steps, Loading a driver, Making a connection, Execute and SQL statement, SQL statements, Retrieving the result, Getting database information.

Text Books :

1. UtamK.Roy, "Web Technologies", Oxford Higher Education, 1st Edition, Seventh Impression.
2. K.L.James, "The Internet- A User Guide", 2nd Edition, PHI Publications.

Reference Books :

1. Introduction to Java Programming‖, Y.Daniel Liang, 6th Edition, Pearson Education, 2007
2. Web Technologies Srinivasan, Pearson Education, 2012.
3. Kognet Learning Solutions inc.,"HTML5 in Simple Steps", DreamTech press.
4. Java EE 5 for Beginners, Ivan Bayross, Sharanam Shah, Cynthia Bayrossand. Vaishali shai,SPD.

Web References:

1. https://www.tutorialspoint.com/html/
2. https://www.tutorialspoint.com/css/
3. https://www.javatpoint.com/java-tutorial

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second sessional exam. Question No 1which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions i.e there will be two questions from each unit and the student should answer any one question.

INTRODUCTION TO CYBER SECURITY(ICS)

V Semester: B.Tech						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
OE304	Open Elective - 1	3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Cyber Security architecture principles

CO2: Identifying different classes of attacks

CO3: Understand about cybercrime with mobile and wireless devices

CO4: Understand about the tools and methods used in cybercrime.

CO5: Understand about cyber security and social media marketing.

UNIT– I

Introduction to Cybercrime

Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.

UNIT– II

Cyber offenses

How Criminals Plan Them –Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.

UNIT– III

Cybercrime Mobile and Wireless Devices

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones. Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

UNIT– IV

Tools and Methods Used in Cybercrime

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing.

UNIT– V

Cyber Security:

Organizational Implications Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing**:** Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

Text Books:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, SunitBelapure, Wiley.
2. Principles of Information Security, MichealE.Whitman and Herbert J.Mattord, Cengage Learning.

Reference Books:

1. Information Security, Mark Rhodes, Ousley, MGH.
2. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press

Web References:

1.https://www.tutorialspoint.com/fundamentals_of_science_and_technology/cyber_crime_and_cyber_security.htm

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second sessional exam. Question No1which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

INTERNET OF THINGS (IOT)

V Semester: B.Tech						Scheme: 2017		
Course Code	Course Category	Hours/Week			Credits	Maximum Marks		
OE305	Open Elective - 1	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course the student will be able to

CO1: Understand the basic knowledge of Internet of things and its design

CO2: Understand the purpose of sensors and Actuators in IoT

CO3: Analyze Various IoT Protocols

CO4: Design IoT Projects Using Arduino

CO5: Understand Raspberry-Pi Processor and Raspbian Operating Systems

UNIT – I

Introduction to IoT:
Definition and Characteristics of IoT, Physical Design and Logical Design, IoT Enabling Technologies, IoT Levels and Deployment Templates, IoT Vs M2M

UNIT – II

Sensing and Actuation:
Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Different types of Actuators, purpose of Sensors and Actuators in IoT

UNIT – III

Wireless Technologies and Data Transmission for IoT:
Wi-Max, Wi-Fi (802.11), Bluetooth/Bluetooth smart, Zigbee/Zigbee smart, Cellular, NFC, Serial Transmission, RS-232, RS-485, I2C Inter-Integrated Circuit, Ethernet, CAN bus, USB, Firewall, Serial ATA, Parallel Transmission.

UNIT – IV

Building IoT with Arduino: Arduino IDE, Programming of Arduino, Interfacing LED, switch, potentiometer, Sensors, LCD, Bluetooth, Wi-Fi, GPS, RFID with Arduino

UNIT –V

Raspberry Pi:
Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files, Permissions, Processes, Linux Graphic user Interface, Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system benefits, Raspberry Pi Set up, Configuration.

Text Books:

1. ArsheepBahga , Vijay Madisetti ,Internet of Things: A Hands-On Approach Paperback, 2015
2. Rajkumar Bhuyya, Internet of Things: Principles and Paradigms ,2016
3. Adeel Javed, Building Arduino Projects for the Internet of Things, Apress,2016
4. Wolfram Donat, Learn Raspberry-Pi with Python, Apress,2016

Reference Books:

1. Charles Bell, Beginning Sensor Networks with Arduino and Raspberry-Pi, Apress,2016
2. AndrianMcEwen , Hakim Casimally, Designing of Internet of Things, John Wiley,2014
3. Warren Gay, Masteringthe Raspberry-Pi, Apress,2016

Web References:

1. https://nptel.ac.in/courses/106105166/
2. https://onlinecourses.nptel.ac.in/noc17_cs22/course
3. https://nptel.ac.in/courses/108108098/4
4. https://onlinecourses.nptel.ac.in/noc19_ee28

Question Paper Pattern:

Sessional Exam:

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End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

NANO TECHNOLOGY (NNT)

V Semester: B.Tech						Scheme: 2017		
Course Code	Course Category	Hours/Week			Credits	Maximum Marks		
OE306	Open Elective - 1	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course the student will be able to

CO1: Acquire some of the fundamental principles behind nanotechnology and nanomaterials and their vital role in novel sensing properties and applications.

CO2: Understand the fabrication, characterization, and manipulation of nano materials, Nano sensors and introduction to sensors.

CO3: Understand about metal nanoparticle based sensors and nanowire based sensors.

CO4: Understand about sensors based on nanostructures of metal oxides.

UNIT – I

Introduction to Nanotechnology:

Definition of nanotechnology; main features of nanomaterials; types of nanostructures (0D, 1D, and 2D structures); nanocomposites; and main chemical/physical/electrical/optical properties of nanomaterials. Methods for characterizing the nanomaterials: Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), and spectroscopy- and spectrometry-based surface analysis techniques. Fabrication of sensors by bottom-up and top-down approaches; self-assembly of nanostructures; and examples for nanotechnology application

UNIT – II

Introduction to Sensors' Science and Technology:

Definition of sensors; main elements of sensors; similarities between living organisms and artificial sensors; working mechanism of physical sensation (seeing, hearing, and feeling) and chemical sensation (smelling and tasting); the parameters used for characterizing the performance of sensors: accuracy, precision, sensitivity, detection limit, dynamic range, selectivity, linearity, resolution, response time, hysteresis, and life cycle

UNIT – III

Metal nanoparticle-based Sensors:

Definition of nanoparticle; features of nanoparticles; and production of nanoparticles by physical approach (laser ablation) and chemical approaches (Brust method, seed-mediated growth, etc.). Quantum Dot Sensors. Definition of quantum dot; fabrication techniques of quantum dots; Macroscopic and microscopic photoluminescence measurements; applications of quantum dots as multimodal contrast agents in bioimaging; and application of quantum dots as biosensors.

UNIT – IV

Nanowire-based Sensors:

Definition of nanowires; features of nanowires; fabrication of individual nanowire by top-down approaches and bottom-up approaches; and fabrication of nanowire arrays (fluidic channel, blown bubble film, contact printing, spray coating, etc.).Carbon Nanotubes-based Sensors: Definition of carbon nanotube; features of carbon nanotubes; synthesis of carbon nanotubes; fabrication and working principles of sensors based on individual carbon nanotube; fabrication and working principles of sensors based on random array of carbon nanotubes.

UNIT – V

Sensors Based on Nanostructures of Metal Oxide:

Synthesis of metal oxide structures by dry and wet methods; types of metal oxide gas sensors (0D, 1D, and 2D); defect chemistry of the metal oxide sensors; sensing mechanism of metal-oxide gas sensors; and porous metal-oxide structures for improved sensing applications.

Text Books :

1. Jiří Janata, Principles of Chemical Sensors, Springer, 2d Edition (1989). 2. Roger George Jackson, Novel Sensors and Sensing, CRC Press (2004).

Reference Books :

1. Florinel-Gabriel Banica, Chemical Sensors and Biosensors: Fundamentals and Applications, John Wiley and Sons (2012).
2. Ramsden Jeremy, Nanotechnology, an Introduction. Elsevier (2011).

Question Paper Pattern:

Sessional Exam:

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End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS (RSGIS)

V Semester : B.Tech						Scheme : 2017		
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	Total
OE307	Open Elective - 1	2	1	-	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration : 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the concept of electromagnetic radiation and its interaction with earth's surface

CO2: Understand air borne and space borne platforms, space imaging satellites of different Countries.

CO3: Understand the image processing techniques and applications of remote sensing.

CO4: Understand the concept of GIS and organization of GIS data structures.

CO5: Understand primary and secondary methods of capturing spatial and attribute data.

UNIT - I

Introduction to Remote Sensing: Concept and Scope of Remote Sensing: Definition – Physics of Remote Sensing – Electro Magnetic Radiation (EMR), Process and Characteristics of Remote Sensing System – Energy Interaction with the atmosphere and Earth Surface Features – Vegetation, soils, water– Spectral Reflectance Curves, atmospheric windows, Advantages and limitations of remote sensing.

UNIT - II

Platforms and Sensors: Remote Sensing Systems: Platforms: Introduction – Types – Satellites and orbits, Passive and Active sensors – Spatial, spectral, radiometric and temporal resolution of satellites, Whiskbroom and Push-broom scanners, Multi-band concepts and False Color Composites - Some remote sensing satellites and their features.

UNIT - III

Image Processing Techniques and Remote Sensing Applications: Digital Image Processing: Image enhancement – Contrast stretch, Spatial filtering and edge enhancement; Classification – Supervised and unsupervised classification – Visual image interpretation techniques.

Remote Sensing Applications - Applications in land use and land cover analysis - Mapping of forest and agriculture - Watershed management - Drought Assessment - Environmental modeling and other applications.

UNIT - IV

Geographic Information System: Basic Concepts*:* Definition - Components - Functions of GIS - Areas of GIS application - Advantages and Limitations of GIS - Information Organization and Data Structures – Raster and Vector data structures - Data file organization and formats - Data Base Management Systems.

UNIT - V

GIS Data Input & Editing: Method of Spatial and Attribute data capture – Primary and Secondary digitization and scanning method - Techniques and procedure for digitizing, Topology – Errors of Digitization and rectification - Re-projection - Transformation and Generalization - Edge matching and Rubber sheeting - Proximity - Buffering and overlay.

Text Books :

1. M. Anji Reddy, Text Book of Remote Sensing and Geographic Information System, BS Publication.
2. Lo C.P. & Yeung A.K.W., (2004), Concepts and Techniques of GIS, Prentice-Hall of India, New Delhi.
3. Thomas Lillesand, Ralph W Kiefer and Jonathan Chipman "Remote Sensing and Image Interpretation", John Wiley & Sons, India

Reference Books :

1. B.Bhatta, *Remote sensing and Geographic Information System*, Oxford Publications.
2. Siddiqui, M.A.(2006), *Introduction to Geographical Information System*, Sharda Pustak Bhavan, Allahabad.
3. Curran, Paul J (1985), *Principles of Remote Sensing*, Longman, London.
4. Floyd F Sabins Jr., *Remote Sensing Principles and Interpretation*, Freeman and Co., San Franscisco.

Web References:

1. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

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End Exam:

Question paper contains Six questions. Question 1 contains 5 short Answer questions each of 2 marks (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions i.e. there will be two questions from each unit and the student should answer any one question.

OPTIMIZATION TECHNIQUES (OT)

VI Semester:	B.Tech				Scheme: 2017			
Course Code	Category	Hours / Week			Credits	Maximum Marks		
OE308	Open Elective - 1	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			

Course Outcomes: At the end of the course students will be able to

CO 1:	Understand basics of operations research, linear programming models
CO 2:	Solve transportation related problems
CO 3:	Solve assignment problems and sequencing problems
CO 4:	Solve queuing and game theory related problems
CO 5:	Solve project management problems

UNIT – I

Introduction: Definition, Significance of Operations Research, Models in Operations Research, Application Areas of Operations Research

Linear Programming: Model Formulation, Graphical solution of L.P.P, Slack, Surplus and Artificial variables, Simplex method, Big M method, Degeneracy in L.P.P, Duality Concept

UNIT – II

Transportation Problems: Introduction Balanced and unbalanced Transportation problems, Initial basic feasible solution using N-W corner rule, least cost method and Vogel's approximation method, Optimal Solution (MODI method), Degeneracy in Transportation Problem

UNIT – III

Assignment Problems: Introduction, The Assignment Algorithm (Hungarian Assignment method), Balanced and Unbalanced Assignment Problems, Travelling Salesman Problem as an Assignment Problem

Sequencing Models: Introduction, General assumptions, processing n jobs through 2 machines, processing 'n' jobs through m machines, Processing 2 jobs through m machines

UNIT – IV

Game Theory: Definitions and Terminology, Two Person Zero Sum Games, Pure Strategy Games (with Saddle Point), Principle of Dominance, Solution for Mixed Strategy Games (Games without Saddle Point) Graphical method

Queuing Theory: Introduction, single channel - poisson arrivals - exponential service times with infinite population, and Multi-channel - poisson arrivals - Exponential service times with infinite population**.**

UNIT – V

Project Management: Phases of project management, guidelines for network construction, critical path, forward and backward pass, floats and their significance, crashing for optimum duration.

Text Books:

1. Hamdy, A. Taha, Operations Research-An Introduction, Prentice Hall of India Pvt. Ltd
2. S.D. Sharma, Operations Research, Kedarnath, Ramnath & Co., Meerut,
3. R. Paneer Selvam, Operations Research , PHI Learning Pvt. Ltd., New Delhi

Reference Books:

1. Hillier / Lieberman, Introduction to Operations Research , Tata McGraw Hill Edition
2. J.K. Sharma, Operations Research-Problems and Solutions, Macmillan India Ltd
3. Billy E Gillett, Introduction to Operations Research A Computer Oriented Algorithmic Approach, Tata McGraw Hill Edition
4. V.K. Kapoor, Operation research

Question Paper Pattern:

Sessional Exam

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End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question

RENEWABLE ENERGY SYSTEMS (RES)

V Semester: B.Tech						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
OE309	Open Elective - 1	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			

Course Outcomes: At the end of the course the student will be able to

CO1: Understand the basics terms, definitions related to solar energy conversion, solar radiation measuring instruments.

CO2: Understand different types of Solar Collectors and their applications.

CO3: Understand the fundamental principles of Wind energy types and its characteristics.

CO4: Understand the methods to harness Electrical Energy from Geothermal and Ocean energies.

CO5: Understand the principles of bio conversion, types, combustion characteristics and its applications

CO6: Understand Direct Energy Conversion principle from Fuel cells and MHD generators.

UNIT - I	
Principles of Solar Radiation	The role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sunshine, solar radiation data.
UNIT - II	
Solar Energy Collection	Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.
Solar Energy Storage And Applications	Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- Solar heating/cooling techniques. Solar distillation and drying, photovoltaic energy conversion.
UNIT – III	
Wind Energy	Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria.
Biomass	Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C. Engine operation and economic aspects.
UNIT - IV	
Geothermal Energy	Resources, types of wells, methods of harnessing the energy, potential in India.
Ocean Energy	OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants and their economics.
UNIT - V	
Direct Energy Conversion	MHD generators, principles, dissociation and ionization, Hall effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems. Fuel cells, principle. Faradays laws, thermodynamic aspects, selection of fuels and operating conditions.

Text Books:

1.G.D. Rai , “Non-Conventional Energy Sources”. 2011

2.Ramesh & Kumar, “Renewable Energy Technologies”, Narosa. 1997

Reference Books :

1.Tiwari and Ghosal , “Renewable energy resources”, Narosa.2005

2.Ashok V Desai, “Non-Conventional Energy”, Wiley Eastern.1990

3.K Mittal ,“Non-Conventional Energy Systems”, Wheeler. 1997

4.Sukhatme, “Solar Energy”. TMH, 2008

Web Resources:

1.https://en.wikipedia.org/wiki/Solar_irradiance
2.http://sfera.sollab.eu/downloads/Schools/Eduardo_Zarza_Basic_concepts.pdf
3.https://en.wikipedia.org/wiki/Solar_energy
4.https://en.wikipedia.org/wiki/Solar_energy
5.https://solarprofessional.com/articles/design-installation/solar-energy-storage
6.https://www.energy.gov/science-innovation/energy-sources/renewable-energy/wind
7.https://www.eia.gov/energyexplained/?page=biomass_home
8.https://en.wikipedia.org/wiki/Geothermal_energy
9.https://www.renewableenergyworld.com/ocean-energy/tech.html
10.http://www.mhdenergy.com/

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question

OBJECT ORIENTED PROGRAMMING THROUGH JAVA (OOP)

VI Semester: B.Tech						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
OE310	Open Elective -2	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the basic programming constructs and object oriented paradigms.

CO2: Comprehend the java concepts packages and interfaces.

CO3: Implement programs on string handling methods.

CO4: Understand the fundamentals of exception handling mechanism.

CO5: Implement programs on multithreading concepts.

UNIT– I

Fundamentals of Object –Oriented Programming: Introduction, Object-Oriented Paradigm, Basic Concepts of Object Oriented programming, Benefits of OOP, and Applications of OOP.
Introduction to Java: Overview of java, Java Buzzwords, Data types, Variables, Operators.
Decision Making-Branching & Looping: simple if statement, if-else statement, nested if-else, else if ladder, switch statement, While, do-while, for statements, Arrays, Classes, objects and methods.

UNIT– II

I/O: I/O Basics, Reading Console input, writing Console output.
Inheritance: Basic concepts, method overriding, super keyword, dynamic method dispatch, Abstract class, final keyword.
Packages and Interfaces: Packages, Access protection, Importing packages, Interfaces.

UNIT– III

String Handling: String Constructors, Special String Operations-String Literals, String Concatenation, Character Extraction, String Comparisons. Searching Strings, Modifying a string.

UNIT– IV

Exception Handling: Fundamentals, Types of Exceptions, Usage of try, catch, throw throws and finally keywords.

UNIT– V

Multithreading: Concepts of multithreading, Creating threads by extending Thread class and implementing Runnable interface, isAlive( ) and join ( ) methods, Thread Priorities, Synchronization, Inter thread communication.

Text Books :

1. Herbert Schildt [2017], [10th Edition], Java -T*he Complete Reference* , TATA McGraw-Hill.

Reference Books :

1. Bruce Eckel [2014], [2nd Edition], *Thinking in Java*, Pearson Education.
2. E.Balagurusamy, *Programming with Java: A primer*, *5th Edition*, Tata McGraw-Hill, 2017.
3. H.M Dietel and P.J Dietel [2017], [11th Edition], Java How to Program, Pearson Ed.

Web References:

1. https://nptel.ac.in/courses
2. https://www.tutorialspoint.com/java/
3. https://www.javatpoint.com

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second sessional exam. Question No 1which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question.

ETHICAL HACKING (EH)

VI Semester: B.Tech					Scheme: 2017			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
OE311	Open Elective - 2	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs					End Exam Duration:3 Hrs			

Course Outcomes: At the end of the course students will be able to

CO1: Understand the importance of security and ethical hacking.

CO2: Understand about foot printing and types of attacks in social engineering.

CO3: Understand about sniffers and DoS attacks.

CO4: Understand the importance of Session Hijacking types and SQL Injection.

CO5: Understand about buffer overflow attacks and Wireless Hacking Techniques.

UNIT– I

Introduction to Ethical Hacking

Introduction, Ethical hacking terminology, Types of hacking technologies, phases of ethical hacking **Essential Terminologies-Threat, Attack, Vulnerabilities, Target of Evaluation, Exploit.**

UNIT– II

Foot printing

Footprinting, Information Gathering Methodology , Competitive Intelligence, DNS Enumeration, Whois and ARIN Lookups, Types of DNS Records, How Traceroute Is Used in Footprinting Contents, How E-Mail Tracking Works, Web Spiders Work.

Social Engineering

Social Engineering, Types Of Attacks, Insider Attacks, Identity Theft, Phishing Attacks, Online Scams, URL Obfuscation, Social-Engineering Countermeasures.

UNIT– III

Sniffers

Understand the Protocols Susceptible to Sniffing, Active and Passive Sniffing, ARP Poisoning, Ethereal Capture and Display Filters, MAC Flooding, DNS Spoofing Techniques, Sniffing Countermeasures.

Denial of Service

Denial of Service, Types of DoS Attacks, How DDoS Attacks Work, How BOTs/BOTNETs Work, "Smurf" Attack, SYN Flooding, DoS/DDoS Countermeasures.

UNIT– IV

Session Hijacking

Spoofing vs. Hijacking, Types of Session Hijacking, Sequence Prediction, Steps in Performing Session Hijacking, Describe How You Would Prevent Session Hijacking.

SQL Injection

SQL Injection, Steps to Conduct SQL Injection, SQL Server Vulnerabilities, SQL Injection Countermeasures.

UNIT– V

Buffer Overflows

Different Types of Buffer Overflow, Methods of Detection, Overview of Stack-Based Buffer Overflows , Overview of Buffer Overflow Mutation Techniques.

Wireless Hacking

Overview of WEP, WPA Authentication Mechanisms, and Cracking Techniques, Wireless Sniffers and Locating SSIDs, MAC Spoofing, Rogue Access Points, Wireless Hacking Techniques, Methods Used to Secure Wireless Networks.

Text Books :

1. Kimberly graves "CEHOfficial Certified Ethical Hacker Review Guide," Wiley
2. MichealGregg,"Certified ethical hacker (CEH) Cert guide",Pearson education, 2014.

Reference Books :

1. Network Security and Ethical Hacking, Rajat Khare, Luniver Press, 2006.
2. Patrick Engebretson,"The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy",2ed, Syngress Media, 2012.

Web References:

1. https://www.tutorialspoint.com/ethical_hacking/ethical_hacking_pdf_version.htm

Question Paper Pattern:

Sessional Exam:

The question paper for Sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second Sessional exam. Question No 1, which carries 6 marks, contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

PRINCIPLES OF PROGRAMMING LANGUAGES (PPL)

VI Semester: B.Tech						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
OE312	Open Elective - 2	3	0	0	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the importance of Programming Languages.

CO2: Describe the syntax and semantics of a programming language.

CO3: Understand programming constructs and data types.

CO4: Develop Programs in Lisp and prolog.

CO5: Understand and adopt a new programming language.

UNIT– I

Preliminaries

Reasons for studying concepts of programming languages, Programming domains, Language Evolution criteria, Influences on Language Design, Language categories, Language Design Trade-offs, Implementation methods, Programming Environments.

UNIT– II

Syntax and Semantics

Introduction, The general problem of Describing Syntax, Formal methods of describing syntax, Attribute Grammars, Describing the Meanings of programs-Dynamic Semantics, Lexical analysis, Parsing problem, Recursive Descent parsing, Bottom up parsing.

UNIT– III

Names, Binding, Type checking, Scopes and Data Types

Introduction, Names, Variables, The concept of binding, Type checking, Strong Typing, Type Compatibility, Scope, Scope and Lifetime, Referencing Environments, Named constants, Data types, Primitive data types, Character string types, User defined ordinal types, Array types, Associative arrays, Record types, Union types, Pointer and reference types.

UNIT– IV

Functional Programming Languages

Introduction, Mathematical functions, Fundamentals of functional programming languages, LISP, An Introduction to Scheme, ML, Haskell.

UNIT– V

Logic Programming Languages

Introduction, A brief introduction to Predicate calculus, Predicate calculus and Proving theorems, An Overview of logic programming, The origins of prolog, Basic elements of prolog, The deficiencies of prolog, Applications of logic programming.

Text Books :

1.Robert W. Sebesta, [Eighth Edition], “Concepts of Programming Languages”, Addison Wesley, 2007.

Reference Books :

1. Allen B Tucker, Robert E Noon,[2nd Edition],“Programming Languages, Principles & Paradigms”, TMH.

Web References:

1. https://cs.fit.edu/~ryan/cse4250/

Question Paper Pattern:

Sessional Exam

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End Exam

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ADVANCED INFORMATION SYSTEMS (AIS)

VI Semester: B. Tech						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
OE313	Open Elective - 2	3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Demonstrate the Object oriented concepts.

CO2: Interpret different types of Inheritance and Polymorphism

CO3: Classify layer functionalities of OSI reference model and TCP Protocol suite

CO4: Summarize the concepts of internetworking, security and IP addressing

CO5: Demonstrate different types of protocols and web contents used in web design

UNIT– I

Introduction to Object Oriented Concepts: Introduction, Programming Techniques, Introduction to Object Oriented Concepts, Concept of Structured Procedural Programming, Class, Object

***Characteristics of Objects*:** Data Abstraction, Classification, Encapsulation and Message Passing. Access Specifiers in Class, UML Class Diagrams.

UNIT– II

Advanced Concepts in Object Oriented Technology: Relationships, Inheritance- Protected Access Specifier, Multiple and Multilevel Inheritance, Generalization and Specialization, Abstract classes, Polymorphism, Implementation of OOC through C++.

UNIT– III

Introduction to computer Networks: Introduction, Network Topology, OSI Reference Model, TCP Protocol Suite, Routing Devices, Types of Networks.

UNIT– IV

Internetworking: Protocols for Internetworking, Internet Address and Domains, Packets, Packet Switched Networks, Virtual Private Network, Working of Internet.

Network Security: Authentication, Authorization, Encryption, Security on Web

UNIT– V

Introduction to Web Technology: Introduction, Hyper Text Transfer Protocol (HTTP), File Transfer Protocol (FTP), Domain Name Server (DNS), Web Applications, Types of Web Content, Multi-Tier Web Applications, Performance of Web Applications.

Text Books :

1. Campus Connect Foundation Programme – Object Oriented Concepts – System Development
2. Campus Connect Foundation Programme – Computer Hardware and System Software Concepts, Programming Fundamentals- Vol. – 1, INFOSYS**.**
3. Campus Connect Foundation Programme – Relational Database Management System, Client Server Concepts, Introduction to Web Technologies - Vol. – 2, INFOSYS
4. E. Balaguruswamy, *Object Oriented programming with C++*, 2017
5. *Data Communications & Networking,* Forouzan, Tata McGrawHill, Fifth edition, 2017

Reference Books :

1. Herbert Schildt , *The Complete Reference C++*, McGraw Hill Education, Seventh Edition,2017
2. M.P. Bhave and S.A. Patekar, *Object Oriented Programming with C++*, Pearson Education, 2008
3. Andrew S. Tenenbaum, *Computer networks*, Pearson education, Fifth edition, 2013

Web References:

1. https://www.tutorialspoint.com/cplusplus/
2. https://www.geeksforgeeks.org/computer-network-tutorials/

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No1which carries 6marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying8marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10markseach. Each of these questions is from one unit and may contain sub-questions. i.e.; there will be two questions from each unit and the student should answer any one question.

Note:

1. Wireshark tool can be used to demonstrate ISO/OSI model in UNIT-III
2. Assignment Questions to be given from UNIT-II that maps POs like PO2, PO3.

SCIENTIFIC PROGRAMMING WITH PYTHON (SCIPYP)

VI Semester: B.Tech						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
OE314	Open Elective - 2	3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand fundamentals of programming –variables, conditions, Lists, Tuples & Dictionaries.

CO2: Understand Arithmetic, Relational, Assignment, Logical, Bitwise, Membership, Identity Operators

CO3: Impart Functions, Scope of variables, Modules, Packages.

CO4: Comprehend Concepts of File I/O, Exception Handling, Classes and Objects.

CO5: Develop general scientific programming through Matplotlib, NumPy and SciPy packages.

UNIT– I

Introduction
History of Python, Features, Advantages, Environment setup and Interaction using Command prompt, IDLE, Script mode, IPython Notebook.
Basic Syntax: Keywords, Identifiers, Variables.
Data Types: Strings, Numbers, Booleans, Date and Time, Lists, Tuples, Dictionaries

UNIT– II

Operators: Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators.
Conditional Statements: if, if-elif-else
Loops: for, while
Control Statements: break, continue, pass

UNIT– III

Functions: Defining Functions, Calling a Function, Function Arguments: Required arguments, Keyword arguments, Default Arguments, Variable-length arguments, Anonymous Functions, The Return Statement, Scope of the Variables in a Function - Global and Local Variables.
Modules: Defining module, namespacing, Importing modules and module attributes, from. Import statement, Module built-in functions, Introduction to Packages.

UNIT– IV

Error and Exceptions: Difference between an error and Exception, Detecting and Handling Exceptions, Raising Exceptions, Assertions, Built-in Exceptions, User Defined Exceptions
Classes and Objects: Overview of OOP terminology, Creating Classes, Creating Instance Objects, Inheritance, Overriding Methods, Overloading Methods, Operators, Data hiding.

UNIT– V

Simple plotting with pylab: Basic plotting, Labels, legends and customization, More advanced plotting
Matplotlib: Matplotlib basics, Contour plots, heatmaps and 3D plots.
NumPy: Basic array methods, Reading and writing an array to a file, Statistical methods, Polynomial, Linear algebra, Matrices, Random sampling, Discrete Fourier transforms
SciPy: Physical constants and special functions, Integration and ordinary differential equations, Interpolation, Optimization, data-fitting and root-finding.
General scientific programming: Floating point arithmetic, Stability and conditioning, Programming techniques and software development.

Text Books :

1. Learning To Program With Python- 2011 Richard L. Halterman
2. Learning Scientific Programming with Python, Christian Hill, Cambridge University Press

Reference Books :

1. Python Programming-An Introduction to Computer Science 2nd edition-John Zelle 2010
2. Python -The Ultimate Beginner's Guide! , Andrew Johansen
3. Core Python Programming, Wesley J. Chun, Pearson.

Web References:

1. https://www.tutorialspoint.com/python3/
2. https://realpython.com/

Question Paper Pattern:

Sessional Exam

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End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions .i.e. there will be two questions from each unit and the student should answer any one question.

Note:

1. Python IDLE, Ipython notebook tools can be used to develop programs in UNIT-1 & UNIT-5.
2. Scope for develop type questions for assignment from UNIT-V

FUZZY LOGIC & NEURAL NETWORKS (FLNN)

VI Semester : B.Tech						Scheme : 2017		
Course Code	Course Category	Hours/Week			Credits	Maximum Marks		
OE315	Open Elective - 2	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course the student will be able to

CO1: To Expose the students to the concepts of Neural networks

CO2: To provide adequate knowledge about Supervised Learning feedback networks

CO3: To provide adequate knowledge about Unsupervised Learning feedback networks

CO4: To teach about the concept of fuzziness involved in various systems and to provide adequate knowledge about fuzzy set theory

CO5: To provide adequate knowledge of application in Neural Networks & fuzzylogic to real time systems.

UNIT – I

Introduction to Neural Networks and its Basic Concepts

Biological neurons and McCulloch and Pitts models of neuron, Types of activation functions, Neural networks architectures, Linearly separable and linearly non-separable systems and their examples, Features and advantages of neural networks over statistical techniques, Knowledge representation, learning process, error-correction learning, concepts of supervised, learning, and unsupervised learning

UNIT – II

Supervised Learning Neural Networks:

Single layer perception and multilayer perceptron neural networks, their architecture, Error back propagation algorithm, generalized delta rule, learning factors, step learning, Momentum learning, Concept of training, testing and cross-validation data sets for design and validation of the Networks

UNIT – III

Unsupervised Learning Neural Networks:

Competitive Learning networks, kohonen self-organizing networks, K-means and LMS algorithms, RBF neural network, its structure and Hybrid training algorithm for RBF neural networks, Comparison of RBF and MLP networks Learning, Hebbian learning, Hopfield networks.

UNIT – IV

Fuzzy logic

Basic Fuzzy logic theory, sets and their properties, Operations on fuzzy set, Fuzzy relation and operations on fuzzy relations and extension principle, Fuzzy membership functions and linguistic variables, Fuzzy rules and fuzzy reasoning, Fuzzification and defuzzification and their methods, Fuzzy inference systems

UNIT – V

Applications:

Applications of Neural Networks: Pattern classification, Handwritten character recognition, Face recognition, Image compression and decompression

Applications of Fuzzy Logic & Fuzzy System: Fuzzy pattern recognition, Fuzzy image processing, Simple applications of Fuzzy knowledge-based controllers like washing machines, traffic regulations, and lift control

Text Books :

1. Timothy J. Ross, Fuzzy Logic with Engineering Applications, John Wiley and sons, III Ed, 2010.
2. S. Haykin, “Neural Networks, A Comprehensive Foundation”, Pearson Education Inc., III Ed 2008.

3. Jacek. M. Zurada, “Introduction to Artificial Neural Systems”, Jaico Publishing House, 2006.
4. LaureneFausett, Fundamentals of Neural Networks-Architectures, algorithms and applications, Pearson Education Inc., 2004.
5. J.S.R. Jang, C.T. Sun, E. Mizutani,, “Neuro Fuzzy and Soft Computing - A computational Approach to Learning and Machine Intelligence”, Pearson Education Inc., 2002..
6. Laurence Fausett, ―Fundamentals of Neural Networks‖, Pearson Education
7. Bart Kosko, ―Neural networks and Fuzzy Systems”, Pearson Education

Reference Books :

1. S. Rajsekaran and G. A. Vijaylakshmi Pai, ―Neural Networks, Fuzzy Logic, and Genetic Algorithms‖, PHI
2. N. Sivanandam, S. Sumathi, and S. N. Deepa, ―Introduction to Neural Network Using MATLAB”, Tata McGraw-Hill Publications
3. S.N.Sivanandam. M.PaulRaj, - Introduction to Artificail Neural Networks, Vikas Publication House Pvt.Ltd, New Delhi.

Question Paper Pattern:

Sessional Exam:

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End Exam:

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BUILDING INFORMATION MODELLING (BIM)

VI Semester :						Scheme : 2017		
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	Total
OE316	Open Elective - 2	1	2	-	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration : 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the basics of BIM and their applications

CO2: Understand the usage of BIM tools and Toolbar

CO3: Use advanced editing tools in making a 3D model of any residential/commercial building

CO4: Prepare templates, create basic walls, curtain walls and also edit the walls like divide, creating openings, etc.

CO5: Apply tools like creating floors, roofs, walls, etc. in making 3D models of any type of structure.

UNIT - I

Introduction: The Basics of BIM - What is Revit? - Understanding a BIM Workflow – Leveraging BIM processes - Visualizing – Analyzing - Strategizing - Focusing Your Investment in BIM - Staffing for BIM - Understanding Project Roles - Establishing a BIM Execution Plan - Accessing and Using the Application Menu - Using the Quick Access Toolbar - Getting to Know the Ribbon - Defining Project Organization - Introducing Datum Objects (Relationships).

UNIT - II

The Basics of the Toolbox: Selecting, Modifying, and Replacing Elements - Selecting Elements - Selection Options - Filtering Your Selection - Using Selection-based Filters - Selecting All Instances – Using the Properties Palette - Matching Properties – Using the Context Menu – Editing Elements Interactively - Moving Elements - Copying Elements – Rotating and Mirroring Elements - Arraying Elements - Scaling Elements – Aligning Elements - Trimming or Extending Lines and Walls - Splitting Lines and Walls - Offsetting Lines and Walls.

UNIT - III

Exploring Advanced Editing Tools: Keeping Elements from Moving - Using the Join Geometry Tool - Using the Split Face and Paint Tools - Copying and Pasting from the Clipboard – Using the Create Similar Tool - Using Keyboard Shortcuts (Accelerators) - Double-click to Edit - Modelling Site Context - Using a Topo surface - Cut/Fill Schedules.

UNIT - IV

Extended Modelling Techniques: Creating Walls and Curtain Walls - Using Extended Modelling Techniques for Basic Walls - Creating Basic Wall Types - Adding Wall Articulation - Modelling Techniques for Basic Walls - Creating Custom In-Place Walls - Creating Stacked Walls - Creating Simple Curtain Walls - Designing a Curtain Wall - Dividing the Surface - Dividing the Surface with Intersects - Applying Patterns - Editing the Pattern Surface.

Configuring Templates and Standards: Introducing Project Templates - Customizing Project - Settings for Graphic Quality - Discovering Object Styles - Using Line Settings – Defining Materials - Defining Fill Patterns – Pre-configuring Colour Schemes - Increasing Efficient view Management - Organizing Views – Saving Work - Saving at Intervals.

UNIT - V

Modelling Floors, Ceilings, and Roofs: Understanding Floor Types - Modelling a Floor - Creating a Structural Floor - Sketching for Floors, Ceilings, and Roofs - Modelling Slab Edges - Creating a Custom Floor Edge - Modelling Floor Finishes - Modelling Thick Finishes - Creating Ceilings - Creating a Roof by Face - Creating a Sloped Glazing - Using Slope Arrows - Using Additional Roof Tools - Using Advanced Shape Editing with Floors and Roofs.

Text Books :

1. Karen Kensek, Douglas Noble, *Building Information Modelling*: BIM in Current and Future Practice.
2. Danelle Briscoe [2015], *Beyond BIM - Architecture Information Modelling*, Routledge Publication, ISBN: 9781317668107.

Reference Books :

1. Chuck Eastman, Paul Teicholz, Rafael Sacks, Kathleen Liston; *BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers, and Contractors*, John Wiley & Sons, Inc.
2. Bimal Kumar, *A Practical Guide to Adopting BIM in Construction Projects*.

Web References:

1. https://www.youtube.com/watch?v=LACe3vtc8dY
2. https://www.youtube.com/watch?v=LQdHkuG4do4

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

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PRODUCT LIFECYCLE MANAGEMENT (PLM)

VI Semester:	B.Tech				Scheme : 2017			
Course Code	Category	Hours / Week			Credits	Maximum Marks		
OE317	Open Elective - 2	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	-	-	3	40	60	100
Sessional Exam Duration : 2 Hrs					End Exam Duration : 3 Hrs			

Course Outcomes : At the end of the course students will be able to

CO1 :	Understand basic concepts of Java such as operators, classes, objects, inheritance, packages Enumeration and various keywords
CO2 :	Understand product lifecycle management process & different steps in Product development process
CO3 :	Get knowledge on Product data management
CO4 :	Understand the implementation of PLM and its impact on the organization
CO5 :	Understand concept of PLM architecture and information authoring tools

UNIT – I

Introduction to Java (background, facts, editions), JVM, Program Structure (basics of class, object, member variables, methods, naming conventions, static, System), Installing Java, Setting PATH, Compiling & Running a minimal program. Primitive data types, cast, NaN, Two's complement, Variables (rules, types), Operators, Control Structures

UNIT – II

Arrays, Constructors, String class, Inheritance, Packages, Access modifiers, Relational Databases, SQL and JDBC

UNIT – III

PLM Introduction-Organization Business Models(MTS, MTO, CTO, ETO Etc), Basics of Enterprise Systems (PLM, ERP, MES), Background, Overview, Need, Benefits, and Concept of Product Life Cycle, Components / Elements of PLM, Emergence of PLM, Significance of PLM, Differences between PLM and PDM Integrated Product development process-Conceive-Specification, Concept design, Design-Detailed design, Validation and analysis (Simulation), Tool design , Realize-Plan manufacturing, Manufacture, Build/Assemble, Test(quality check)

UNIT – IV

PLM Components - Workflow Processes, Design Collaboration, Processes Management, Document Management, Visualization, Bill of Materials (BOM) Management, Engineering Change Control, Configuration Management, Manufacturing Process Management, Variant Management, Classification.

UNIT – V

PLM Technologies - PLM Architecture, Various PLM tools, Data Modelling, Security management, CAD Integrations, Information authoring tools (e.g., MCAD, ECAD, Technical publishing), Core functions (e.g., data vaults), Data Flow to Other systems such as Supply chain and ERP systems

Text Books:

1. Grieves, Michael, Product Lifecycle Management, McGraw-Hill
2. Antti Saaksvuori, Anselmi Immonen**,** Product Life Cycle Management - Springer
3. Kari Ulrich and Steven D. Eppinger, Product Design & Development, McGraw Hill

Reference Books:

1. Java - The Complete Reference (English) 9th Edition-herbert-schildt-Mcgraw Hill Education
2. Head First Java (English) 2 Edition- Kathy-Sierra-Publisher: O' Reilly
3. Burden, Rodger PDM: Product Data Management, Resource Publications

Question Paper Pattern:

Sessional Exam

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End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question

SIMULATION OF ENGINEERING SYSTEMS (SES)

<table>
<tr><td colspan="5">VI Semester: B.Tech</td><td colspan="4">Scheme : 2017</td></tr>
<tr><td>Course Code</td><td>Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">OE318</td><td rowspan="2">Open Elective - 2</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exam</td><td>Total</td></tr>
<tr><td>0</td><td>0</td><td>3</td><td>3</td><td>40</td><td>60</td><td>100</td></tr>
<tr><td colspan="5">Sessional Exam Duration:2 Hrs</td><td colspan="4">End Exam Duration: 3Hrs</td></tr>
<tr><td colspan="9">Course Outcomes: At the end of the course students will be able to</td></tr>
<tr><td colspan="9">CO1: Understand the basic features and programming in MATLAB.</td></tr>
<tr><td colspan="9">CO2: Understand control statements, functions and plotting in MATLAB.</td></tr>
<tr><td colspan="9">CO3: Understand developing simulation model using simulink library.</td></tr>
<tr><td colspan="9">CO4: Understand the graphical user interface in MATLAB.</td></tr>
<tr><td colspan="9">CO5: Understand various tool boxes used in solving engineering problems.</td></tr>
<tr><td colspan="9">UNIT-I</td></tr>
<tr><td colspan="2">MATLAB Environment</td><td colspan="7">Introduction to Simulation-Installation of MATLAB-History-Use of MATLAB-Key features.
Introduction to MATLAB Software- MATLAB window- Command window- Workspace-Command history-Current directory Setting-Basic commands-Assigning variables-Operations with variables.</td></tr>
<tr><td colspan="2">Data types and Operators</td><td colspan="7">Character and string- Arrays and vectors- Column vectors-Row vectors.
Arithmetic Operators- Relational Operators-Logical Operators- Operator Precedence- BODMAS Rules- Solving arithmetic equations.</td></tr>
<tr><td colspan="2">Basic Operations</td><td colspan="7">Trigonometric functions- Complex numbers- Fractions & Real numbers-Complex numbers</td></tr>
<tr><td colspan="9">UNIT-II</td></tr>
<tr><td colspan="2">MATLAB Programming</td><td colspan="7">Working with script tools- Writing Script file- Executing script files- The MATLAB Editor- opening and saving editor.
Creating M files, Saving m-files- Errors and Warnings- Types of errors- error handling- MATLAB Debugger- Setting Break Points- Examining Variables-Stepping through code- ending the debug session- Debugging from command line.</td></tr>
<tr><td colspan="2">Loops and Conditional Statements</td><td colspan="7">Loops: for loop- nested for loop- while loop-
Branch Control Structure: if control statements, switch statement- break statement- continue statement- error statement- try catch structure- Program Termination — return</td></tr>
<tr><td colspan="2">Functions</td><td colspan="7">Writing functions, Writing user defined functions- Built in Function-Function calling-Return Value- Types of Functions-Global Variables.
String Functions- Input/Output Functions.</td></tr>
<tr><td colspan="2">Plotting</td><td colspan="7">Plots: Plotting vector and matrix data- Plot labeling, curve labeling and editing.
2D Plots: Basic Plotting Functions-Creating a Plot-Plotting Multiple Data Sets in One Graph-Specifying Line Styles and Colors- Graphing Imaginary and Complex Data-Figure Windows-Displaying Multiple Plots in One Figure-Controlling the Axes-Subplots
3Dplots: Use of mesh grid function- Mesh plot-Surface plot</td></tr>
</table>

UNIT-III	
Simulink	Introduction to Simulink- Simulink Environment & Interface- Study of Library- Object Oriented Design-Equation Oriented Design- - Fixed Step continuous solvers- Variable step continuous solver- Data Import/ Export- Creating and masking a Subsystem- Getting help for Simulink. Simulation of Numerical Integration, Linear Algebra, Roots of Polynomials, Algebraic equations, Differential Equations-Transforms (Fourier, Laplace).
UNIT-IV	
Graphical User Interface Design	Introduction of Graphical User Interface- GUI Function Property- GUI Component Design- GUI Container- Writing the code of GUI Callback- Dialog Box- Menu Designing- Creating a database-Applications.
UNIT-V	
Applications with MATLAB	**Image Processing:** Importing and Visualizing Images- Importing and displaying images- Converting between image types- Exporting images- Interactive Exploration of Images- Obtaining pixel intensity values- Extracting a region of interest- Computing pixel statistics-Measuring object sizes. MATLAB Applications in Control Systems, Neural Networks- Machine Learning, Digital Signal Processing, Communication Systems and Fuzzy Logic Systems.

Text Books:

1. Raj Kumar Bansal, Ashok Kumar Goel and Manoj Kumar Sharma, "MATLAB and its Applications in Engineering", Dorling Kindersly India pvt. Ltd, Pearson, 5th Edition 2012.
2. Agam Kumar Tyagi, "MATLAB and Simulink for Engineers", Oxford University Press, 2nd Edition, 2012.
3. Jaydeep Chakravarthy, " Introduction to MATLAB Programming, Tool Box and Simulink", Universities Press, 2014.

Reference Books:

1. Misza Kalechman , " Practical MATLAB Basics for engineers", CRC Press, Taylor & Francis group, 1st Edition, 2012.
2. Rizwan Butt , "An Introduction to differential equations on MATLAB", Narosa Publishing house, 2016.

Web References:

1. https://matlabacademy.mathworks.com/
2. https://www.edx.org/course/matlab-octave-beginners-epflx-matlabeoctavebeginnersx

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question paper contains Six questions; question 1 contains 5 short answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

DATA SCIENCE with R (DSR)

VII Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS411	Open Elective - 3	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the analytical life cycle of a data science project

CO2: Demonstrate the Basic Concepts of R Programming

CO3: Apply various visualization methods for representation of results

CO4: Organize the data for the modeling process

CO5: Evaluate the quality of model

UNIT– I

Introduction to data science:

The roles in a data science project , Stages of a data science project, Defining the goal, Data collection and management, Modelling, Model evaluation and critique, Presentation and documentation, Model deployment and maintenance.

UNIT– II

Introduction to R Programming:

Understanding Data Structures in R – Lists, Matrices, Vectors Basic Building Blocks in R, Basic Operations Operators and Types, Handling Missing Values in R, Subsetting Vectors in R, Matrices and Data Frames in R, Logical Statements in R, Lapply, Sapply, Vapply and Tapply Functions

UNIT– III

Data Visualization using R:

Statistical models in R, Packages, A sample session.

Introduction to graphical Analysis: Box-whisker plots, Scatter Plots, pair plots, Line charts, pie charts, Dot charts, Bar Charts.

UNIT– IV

Loading data into R:

Working with data from files, working with well-structured data from files or URLs, Using R on less-structured data, Transforming data in R, Examining our new data.

Exploring data: Using summary statistics to spot problems, Typical problems revealed by data summaries, Spotting problems using graphics and visualization.

Managing Data: Cleaning Data, Data Transformations, Sampling for Modeling And Validation.

UNIT– V

Choosing and Evaluating models:

Mapping problems to machine learning tasks, Solving classification problems, Solving scoring problems, Working without known targets, Problem-to-method mapping.

Evaluating models: Evaluating classification models, Evaluating scoring models, Evaluating clustering models, Validating models**,** Linear and logistic regression, Data Analysis Case Study.

Text Books :

1. Practical Data Science with R by Nina Zumel ,John Mount, Manning Publications,2016
2. R Programming for Data Science, by Roger D. Peng, https://leanpub.com/rprogramming

Reference Books :

1. Hands-On Programming with R: Write Your Own Functions and Simulations by Garrett Grolemund
2. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data 1st Edition by Hadley Wickham ,Garrett Grolemund

Web References:

1. www.r-project.org/about.html
2. www.dataquest.io
3. www.tutorialspoint.com/r/index.htm

Question Paper Pattern:

Sessional Exam:

The question paper for Sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second Sessional exam. Question No 1, which carries 6 marks, contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

INTERNET PROTOCOLS (INP)

VII Semester: B.Tech						Scheme: 2017		
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
CS412	Open Elective - 3	**3**	**0**	**0**	**3**	**40**	**60**	**100**
Sessional Exam Duration: 2 Hrs						**End Exam Duration: 3 Hrs**		

Course Outcomes: At the end of the course students will be able to

CO1: Summarize OSI and TCP/IP reference models.

CO2: Understand Sub netting and ARP, RARP Protocols

CO3: Analyze Header format of IPv4, Checksum and ICMP Protocol

CO4: Compare TCP and UDP Protocols

CO5: Understand HTTP, RTP,RTCP and IPv6 Protocol

UNIT– I

***Introduction*:** Internet administration, OSI model, TCP/IP protocol and Addressing. IP Addresses, Classful Addressing, Subnetting and Supernetting.

UNIT– II

***Classless addressing*:** Variable length block, Subnettting. Delivery, forwarding and Routing of IP packet. ARP and RARP protocols.

UNIT– III

***Internet Protocol*:** Datagram, options, checksum, IP package. ICMP: Types of messages, Message Format, Error Reporting and Query.

UNIT– IV

***UDP and TCP*:** Process-to-process communication, user datagram, UDP operation, UDP package. TCP services, features, segment, connection, flow control, error control, congestion control, times, package.

UNIT– V

***HTTP, Multimedia and Private Networks*:** HTTP architecture, web documents, RTP, RTCP, voice over IP, Private networks, Virtual networks, IPv6, ICMPv6, Transition from IPv4 to IPv6.

Text Books :

1. Behrouz A. Forouzan [2008], [3rd Edition], TCP/IP Protocol Suite, Tata McGraw Hill

Reference Books :

1. W.Richard Stevens, G.Gabrani [2001], TCP/IP Illustrated, The Protocols, Pearson Education.
2. S.Keshar [2007], [II Edition], An Engineering Approach to Computer Networks, Pearson Education
3. Douglas E Comer, Internetworking with TCP/IP, Pearson Education

Web References:

1. https://www.geeksforgeeks.org/computer-network-tcpip-model
2. http://www.steves-internet-guide.com/internet-protocol-suite-explained
3. https://www.tutorialspoint.com/data_communication_computer_network

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second sessional exam. Question No 1which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions i.e there will be two questions from each unit and the student should answer any one question.

DOT NET TECHNOLOGIES (DNT)

VII Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS413	Open Elective - 3	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	6	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Illustrate the usage of loops, conditional statements, Arrays, Functions and Structures using Console based applications.

CO2: Explain inheritance, polymorphism using classes, objects, interfaces, Collections and Generics.

CO3: Understand the working of Menus, Button, Label, Radio Button, Checkbox, Text Box, List Box, Checked List Box, List View, Tab Control using Windows applications.

CO4: Compare the features of SDI and MDI applications using windows forms.

CO5: Explain the process of writing insert, update ,delete and select statements using ADO .NET

.

UNIT– I

Introduction to C#: .NET Framework, What is C#, Writing a C# program, Variables and Expressions Flow control – Branching & Looping.
Control structures in C#: Type conversion – Implicit & Explicit, Complex variable types- Arrays, Structures & Enumerations, Functions, Error handling.

UNIT– II

Introduction to OOP using C#: OOP Techniques – Inheritance, Polymorphism, Interfaces, Events Defining classes, Defining class members – Member definitions, Collections, Generics – Using generics.

UNIT– III

Basic windows programming: Controls – Button, Label, Link Label, TextBox, Radio Button, CheckBox, RichTextBox, ListBox,CheckedListBox, ListView, TabControl.

UNIT– IV

Advanced windows programming: Menus, Toolbars, Single Document Interface (SDI), Multiple Document Interface (MDI) application, Building MDI applications .

UNIT– V

Introduction to ADO.NET and ASP.NET: ADO.NET – Data Access components,
Database programming with SQL SERVER
ASP.NET – Creating a simple page, Server controls.

Text Books :

1. Harsh Bhasin, Programming in C#, Oxfod University Press 2014, New Delhi.
2. Karli Watson, Christian Nagel, Jacob Vibe Hammer, Jon D.Reid, Morgan Skinner, Daniel Kemper, Beginning Visual C# 2012 Programming, Published by Jhon Wiley & sons, Inc.,
3. Dan Clark, Beginning C# Object Oriented Programming, New York, 2013, 2nd Edition.

Reference Books :

1. John Sharp, Microsoft Visual C# 2013 Step by Step, Microsoft Press, Washington,2013.
2. E.Balagurusamy, Programming in C#, Tata McGraw-Hill Publisher 2010, New Delhi, 3rd

Web References:

1. https://www.tutorialspoint.com

Question Paper Pattern:

Sessional Exam

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End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question.

NATURAL LANGUAGE PROCESSING (NLP)

VII Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS414	Open Elective - 4	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand different Levels of Natural Language Analysis.

CO2: Outline Phonological Rules and Transducers.

CO3: Identify N-grams for a given Natural Language.

CO4: Analyze Speech Recognition Algorithms.

CO5: Examine Parsers and features of Grammars.

UNIT– I

Introduction to Natural Language Understanding: The study of Language, Applications of Natural Language Understanding, Evaluating language Understanding Systems, The different Levels of Language Analysis, Representations and Understanding.

UNIT– II

Morphology and Finite-State Transducers: Survey of English Morphology, Finite-State morphological parsing.

Computational Phonology and Text-to-Speech: Speech Sounds and Phonetic Transcription, The phoneme and phonological Rules, Phonological Rules and Transducers, Machine learning of Phonological Rules.

UNIT– III

N-grams: Counting words in corpora, simple (unsmoothed) N-grams, smoothing, back off, Deleted Interpolation, N-grams for spelling and Pronunciation, entropy.

UNIT– IV

HMMs and Speech Recognition: Speech Recognition Architecture, Overview of Hidden Markov models, The Viterbi Algorithm Revisited, Advanced method for decoding, Acoustic Processing of Speech. computing Acoustic Probabilities, Training a Speech Recognizer

UNIT– V

Grammar and Parsing: grammars and sentence structure**,** what makes a good grammar A top-Down Parser, A Bottom-Up Parser, Transition Network Grammar.

Featured and Augmented Grammars: Feature Systems and Augmented Grammars, some basic featured systems for English, Morphological Analysis and the lexicon, A simple grammar using Features, parsing with features.

Text Books :

1. "Speech and Language Processing" by Daniel Jurafsky and James H Martin, Pearson Education Second Edition.
2. "Natural Language Understanding" by James Allen, Pearson Education Second Edition.

Reference Books :

1. Thomas M. Cover and Joy A.Thomas, Elements of Information Theory, Wiley.
2. Charniak .E, Statistical Language Learning, The MIT Press.

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8marks each

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question.

HUMAN COMPUTER INTERACTION (HCI)

VII Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
CS415	Open Elective-4	3	0	0	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the importance and principles of User Interface design.

CO2: Understand Human characteristics, Human interaction design process.

CO3: Analyze and organize various elements of application level screen.

CO4: Select and apply system level user interface components.

CO5: Identify and apply proper device based controls, testing methods of user interface.

UNIT– I

Introduction

Importance of user Interface – definition, importance of good design, Benefits of good design. A brief history of Screen design.

The Graphical User Interface

Popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT– II

Design Process

Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, and understanding business functions.

UNIT– III

Screen Designing

Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT– IV

System Menus

Structures of Menus, Functions of Menus, Content of Menus, Kinds of Graphical menus.

Windows

New and Navigation schemes selection of window, selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT– V

Controls

Characteristics of device based controls, Selecting the proper device based controls, Operable controls, Text Entry/Read-only controls, Selection controls, Combination Entry/selection controls, Selecting the proper controls.

Testing

The purpose and importance of usability testing, Scope of testing, Prototypes, Kinds of Tests, Developing and conducting the test.

Text Books :

1. Wilbert O Galitz, The essential guide to user interface design, 2nd Edition. Wiley, India, 2009
2. Alan Dix, Janet Finlay, Gregory D. Abowd, Russell Beale, Human – Computer Interaction, 3rd Edition, Pearson Publishers, 2008.

Reference Books :

1. Ben Shneidermann(2008), Designing the user interface, 4th Edition, Pearson Education Asia.
2. Rogers, Sharps, Prece (2013), Interaction Design 3rd Edition, Wiley, India.
3. Soren Lauesen (2005), *User Interface Design*, Pearson Education.
4. Human Computer Interaction, Smith-Atakam, Cengage Learning.
5. Human Computer Interaction, I. Scott Mackenzie, Elsevier Publishers.

Web References:

1. https://nptel.ac.in/courses/106103115/
2. https://www.interaction-design.org/literature/topics/human-computer-interaction
3. http://ps.fragnel.edu.in/~dipalis/prgdwnl/eguid.pdf
4. https://www.tutorialspoint.com/human_computer_interface/quick_guide.htm

Question Paper Pattern:

Sessional Exam

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End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

Note:

1. Microsoft Visual Basic/ JBuilder, Sketch, Invision Studio, Figma and Framer X etc. tools can be used to demonstrate User interface screens in UNIT-III & IV.
2. Faculty can assess student's analysis / design skills by making them to design user interface for a given application in UNIT-III & IV.

SOFTWARE QUALITY AND TESTING (SQT)

VII Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
CS416	Open Elective-4	3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the basic concepts of software testing

CO2: Classify the types of software testing to point out the importance of testing in achieving high-quality software

CO3: Use the various testing techniques of a software system

CO4: Compare the traditional software testing and web based testing

CO5: Extend the Quality concepts and Metrics for the Software Quality

UNIT– I

Introduction to Software Testing:

Introduction, Evolution of Software Testing, Software Testing—Myths and Facts, Goals of Software Testing, Psychology for Software Testing, Software Testing Definitions, Model for Software Testing, Effective Software Testing vs. Exhaustive Software Testing, Effective Testing is Hard, Software Testing as a Process, Software Failure Case Studies.

UNIT– II

Software Testing Terminology and Methodology:

Software Testing Terminology, Software Testing Life Cycle (STLC), Software Testing Methodology.

Verification and Validation: Verification and Validation (V&V) Activities, Verification, Verification of Requirements, Verification of High-level Design, Verification of Low-level Design, How to Verify Code? Validation.

UNIT– III

Testing Techniques:

Dynamic Testing: Black-Box Testing Techniques Boundary Value Analysis (BVA), Equivalence Class Testing, State Table-Based Testing, Decision Table-Based Testing, Cause-Effect Graphing Based Testing, Error Guessing.

White-Box Testing Techniques Need of White-Box Testing, Logic Coverage Criteria, Basis Path Testing, Graph Matrices, Loop Testing.

UNIT– IV

Testing Web-based Systems:

Web-based System, Web Technology Evolution, Traditional Software and Web-based Software, Challenges in Testing for Web-based Software, Quality Aspects, Web Engineering (Webe), Testing of Web-based Systems.

UNIT– V

Software Quality Management:

Software Quality, Broadening the Concept of Quality, Quality Cost, Benefits of Investment on Quality, Quality Control and Quality Assurance, Quality Management (QM), QM and Project Management, Quality Factors, Methods of Quality Management, Software Quality Metrics, SQA Models.

Text Books :

1. Software Testing Principles and Practices, Chauhan, Oxford University Press
2. Software Testing, Yogesh Singh, University Press.

Reference Books :

1. Software Testing and Quality Assurance, Theory and Practice A JOHNWILEY & SONS, INC., PUBLICATION by *KSHIRASAGAR NAIK*
2. Fundamentals of Software Testing, AB Mathur, Pearson

Question Paper Pattern:

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End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

Note:

1. Selenium is the latest testing tool can be used to demonstrate the Web Based System in UNIT-4.
2. For UNIT-3 we have problems to solve and assignment questions

ADVANCED COMPUTER ARCHITECTURE(ACA)

V Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS307	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the concept of parallel processing, classification schemes and memory addressing schemes in parallel processing systems.

CO2: Apply the concept of Pipelining in function evaluation using reservation table.

CO3: Understand the principles of pipelining in designing pipeline processors.

CO4: Understand the SIMD array structures, algorithms for array processors and SIMD Interconnection networks.

CO5: Understand the characteristics of multiprocessor systems, interconnection networks and the importance of data flow computers over control flow computers.

UNIT– I

Introduction to parallel processing:

Trends towards parallel processing, parallelism in uniprocessor systems, parallel computer structures, architecture classification schemes, memory hierarchy in parallel processing systems.

UNIT– II

Pipelining:

Pipeline concept, Linear pipelining and space time diagram, Classification of pipe line processor, Nonlinear pipeline and Reservation table, Instruction and Arithmetic pipelines.

UNIT– III

Principles of designing pipeline processors:

Instruction prefetch and Branch handling, Data buffering and Busing structures, Internal forwarding and register tagging, Hazard detection and resolution, Job sequencing and Collision prevention.

UNIT– IV

SIMD Array Processors:

SIMD structures and algorithms for array processors, organization, masking and routing mechanisms, inter processor communication, parallel algorithms for array processors (matrix multiplication and parallel sorting).

SIMD interconnection network: Single stage and Multistage network, Cube network, Barrel shifter, shuffle exchange and Omega networks.

UNIT– V

Multiprocessor architecture: Loosely coupled and tightly coupled multiprocessor systems, processor characteristics, interconnection network, timeshared or common busses, crossbar switch and multi-port memories, multistage network.

Data flow computers: Control flow Vs Data flow, Data flow computer architectures, Data flow graphs and languages, Data flow and design alternatives-Dependency driven approach and Multi level driven approaches.

Text Books:

1.Kai Hwang, Faye Briggs [2017], "Computer architecture and parallel processing", ISBN 10: 125902914X ISBN 13: 9781259029141 Publisher: Mc Graw Hill India, 2017

2.Kai Hwang (2017), Advanced Computer Architecture-Parallelism, Scalability, Programmability, McGraw Hill.

Reference Books:

1.David E. Culler, J. P. Singh, Anoop Gupta, Harcourt Asiam, Morgan Kaufmann (1999), Parallel

2.V. Rajararnan, C. Siva Ram Murthy (2000), Parallel Computers - Architecture and Programming, Prentice Hall of India, New Delhi.

Web References:

1. https://nptel.ac.in/courses/108105118/25
2. https://nptel.ac.in/courses/117106111/23
3. https://nptel.ac.in/courses/117104128/5
4. https://www.tutorialspoint.com/parallel_computer_architecture/

Question Paper Pattern:

Sessional Exam:

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End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

Artificial Intelligence (AI)

<table>
<tr><td colspan="5">V Semester: B.Tech-CSE</td><td colspan="4">Scheme: 2017</td></tr>
<tr><td>Course Code</td><td colspan="2">Category</td><td colspan="2">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">CS308</td><td colspan="2" rowspan="2">Professional Elective</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exam</td><td>TOTAL</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td>3</td><td>40</td><td>60</td><td>100</td></tr>
<tr><td colspan="5">Sessional Exam Duration:2 Hrs</td><td colspan="4">End Exam Duration:3 Hrs</td></tr>
<tr><td colspan="9"></td></tr>
<tr><td colspan="9">Course Outcomes: At the end of the course students will be able to</td></tr>
<tr><td colspan="9">CO1: Recognize how foundations laid for Artificial Intelligence.</td></tr>
<tr><td colspan="9">CO2: Describe the nature, Structure and Behaviour of agents in the environment.</td></tr>
<tr><td colspan="9">CO3: Solving agent’s problems by using Breadth, Depth, Uniform, Depth- limited, Iterative deepening, Bidirectional Search Strategies</td></tr>
<tr><td colspan="9">CO4: Solve agent’s problems by Greedy, A *, Memory bounded heuristic search strategies, heuristic functions.</td></tr>
<tr><td colspan="9">CO5: Understand the biological neural networks.</td></tr>
<tr><td colspan="9">UNIT– I</td></tr>
<tr><td colspan="9">Introduction
What Is AI?, The Foundations of Artificial Intelligence, The History of Artificial Intelligence</td></tr>
<tr><td colspan="9">UNIT– II</td></tr>
<tr><td colspan="9">Intelligent Agents
Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, The Structure of Agents.</td></tr>
<tr><td colspan="9">UNIT– III</td></tr>
<tr><td colspan="9">Solving Problems by Searching
Problem-Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies.</td></tr>
<tr><td colspan="9">UNIT– IV</td></tr>
<tr><td colspan="9">Informed (Heuristic) Search Strategies
Greedy best-first search, A* search, Memory-bounded heuristic search, learning to search better. Heuristic Functions.</td></tr>
<tr><td colspan="9">UNIT– V</td></tr>
<tr><td colspan="9">Artificial Neural Networks
Neural network structures, Single-layer feed-forward neural networks, Multilayer feed-forward neural networks, Learning in multilayer networks, Learning neural network structures.
Nonparametric Models: Nearest neighbour models, Finding nearest neighbours with k-d trees, Locality-sensitive hashing, Nonparametric regression.</td></tr>
</table>

Text Books:

1. Stuart Russell and Peter Norvig, “Artifcial Intelligence: A Modern Approach”, Third Edition,
2. Yegnanarayana, B. "Artificial neural networks". PHI Learning Pvt. Ltd., 2009

Reference Books:

1. "Artificial Intelligence”, 2nd Edition, E.Rich and K.Knight (TMH).
2. Judea Pearl, “Probabilistic Reasoning in Intelligent Systems”, Morgan Kaufmann, 1988.
3. "Introduction to Artificial Intelligence", Rajendra Akerkar; Prentice Hall of India, 2005.

Web References:

1. https://www. https://medium.com/
2. https:// https://ai.google/education/
3. http:// http://www.opennn.net/

Question Paper Pattern:

Sessional Exam:

The question paper for Sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second Sessional exam. Question No 1, which carries 6 marks, contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

COMPUTER GRAPHICS (CG)

V Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS309	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand line drawing algorithms and circle generating algorithms.

CO2: Understand display devices and polygon filling algorithms.

CO3: Understand two dimensional transformations.

CO4: Understand clipping algorithms, 3D transformations, back face detection algorithms.

CO5: Understand Curve generation and Color models.

UNIT– I

Introduction: Applications of computer graphics, Points, Lines, Pixels and Frame buffer, Primitive operations, Screen grid coordinates, Normalized device coordinates, Line drawing algorithms-DDA and Bresenham, Mid-point circle algorithm, Antialiasing techniques.

UNIT– II

Display Devices: CRTs, Raster scan systems, Random scan systems, Color CRT monitor, Flat panel displays, Graphics input devices, Types of polygons, Inside-Outside test (odd-even, winding number methods), Scan-line polygon fill, Boundary fill, Flood fill algorithms.

UNIT– III

2D Transformations: Types of transformations- Coordinate transformations, Geometric transformations, Basic transformations- Translation, Scaling, Rotation, Homogeneous coordinates, Compound transformations- Reflection, Shearing, Transformations about arbitrary points & lines.

UNIT– IV

Windowing and Clipping: Window, Viewport, Viewing transformation, Clipping-Cohen Sutherland line clipping, Sutherland Hodgeman polygon clipping algorithms. 3D transformations, 3D object representations, Hidden surfaces & lines, Back face detection & removal- Z-buffer, Painter's algorithms.

UNIT– V

Curves: Introduction, Curve generation, Interpolation, Bezier curve Algorithm. Color models: RGB, YIQ, CMY, HSV, HLS.

Text Books:

1. Donald Hearn and M. Pauline Baker [2007], Computer Graphics C Version II edition, Eastern Economy Edition.
2. Steven Harrington [2006], Computer Graphics, A programming approach, MGH.

Reference Books:

1. David F. Rogers [2008], [II Edition], Procedural elements of Computer Graphics, Tata
2. Xiang Zhigang and Plastock Roy A [2003], [Schaum‟s outline of Theory and problems of Computer Graphics, [II Edition], Computer Graphics.
3. W. M. Newman & R. F. Sproull [1997], [II Edition], Principles of Interactive Computer Graphics, Tata McGraw Hill Co.
4. F.S. Hill, Stephen M kelley, Computer Graphics using OPENGL, Third edition, Prentice
5. Computer Graphics, Sinha & Udai, - TMH

Web References:

1. https://nptel.ac.in
2. https://www.sanfoundry.com/
3. https://www.geeksforgeeks.org/computer-graphics

Question Paper Pattern:

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End Exam

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MOBILE APPLICATION DEVELOPMENT (MAD)

V Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS310	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand Android OS, Eclipse IDE, Android SDK and tools.

CO2: Understand Activities, Fragments and Intents in Android Apps.

CO3: Apply different Layouts in Android Apps.

CO4: Design an Android App's User Interface.

CO5: Apply options menus and context menus.

UNIT– I

Getting Started with Android Programming

What is Android? Obtaining Required Tools, Creating First Android Application, Anatomy of an Android Application

UNIT– II

Activities, Fragments and Intents

Understanding Activities, Linking Activities Using Intents, Fragments, Calling Built-in Applications Using Intents, Displaying Notifications

UNIT– III

Android User Interface

Components of a Screen, Adapting to Display Orientation, Managing Changes to Screen Orientation, Utilizing the Action Bar, Creating the User Interface Programmatically

UNIT– IV

Designing User Interface with Views

Using Basic Views, Using Picker Views, Using List Views to Display Long Lists, Understanding Specialized Fragments

UNIT– V

Displaying Pictures and Menus With Views

Using Image Views to Display Pictures, Using Menus with Views, Some Additional Views

Text Books:

1. Wei-Meng Lee, Beginning Android 4 Application Development 2015
2. Barry Burd, Android Application Development All-In-One for Dummies, Second Edition 2015

Reference Books:

1. John Horton, Android Programming for Beginners 2015
2. Rick Boyer, Kyle Mew, Android Application Development Cookbook, Second Edition 2016

Web References:

1. https://www.tutorialspoint.com/android/index.htm
2. https://www.javatpoint.com/android-tutorial
3. https://developer.android.com/

Question Paper Pattern:

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End Exam

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DISTRIBUTED SYSTEMS (DS)

VI Semester : B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS316	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the models and design requirements of distributed systems.

CO2: Describe Client Server Model, Communication Methods of Distributed System

CO3: Classify Clock Synchronization, Mutual Exclusion, Deadlocks in Distributed System

CO4: Summarize the concepts of Threads, Processor Allocation Algorithms

CO5: Understand Distributed File System Design with Implementation

UNIT– I

Introduction to Distributed Systems: Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges.

System Models: Introduction, Architectural Models- Software Layers, System Architecture, Variations, Interface and Objects, Design Requirements for Distributed Architectures, Fundamental Models- Interaction Model, Failure Model, Security Model.

UNIT– II

Communication in Distributed Systems

Client-Server Model: Clients &Servers, addressing, blocking Vs non-blocking primitives, buffered Vs unbuffered primitives, reliable Vs unreliable primitives, Implementing client-server model.

Remote Procedure Call: Basic RPC operation, parameter passing, dynamic binding, RPC semantics in presence of failures, implementation issues.

UNIT– III

Synchronization in Distributed Systems

***Clock Synchronization*:** Logical clocks, physical clocks, clock synchronization algorithms, use of synchronized clocks.

***Mutual Exclusion*:** Centralized algorithm, distributed algorithm, token ring algorithm.

***Dead Locks*:** Distributed deadlock detection and prevention.

UNIT– IV

Processes and Processors in Distributed Systems

Threads-Introduction, threads usage, design issues, implementing a threads package, threads and RPC.

Processor Allocation-Allocation models, design issues for processor allocation algorithms, implementation issues for processor allocation algorithms, example processor allocation algorithms.

UNIT– V

***Distributed File System Design*:** File service interface, directory service interface, semantics of file sharing.

***Implementation*:** File usage, system structure, caching, replication. Trends in Distributed File System.

Text Books:

1. Andrew S. Tanenbaum, *Distributed Operating System,* Pearson Education.
2. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems- Concepts and Design", Fourth Edition, Pearson Publication.

Reference Books:

1. Mukesh Singhal, Niranjan G. Shivaratri, *Advanced Concepts in Operating Systems.*
2. Sinha, Distributed Operating System: Concepts and Design, PHI

Web References:

1. https://www.e-reading.club/book.php?book=143358
2. http://www.ia.pw.edu.pl/~tkruk/edu/rso.b/lecture/pre/rso01_pre.pdf

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MULTIMEDIA AND ANIMATION (MAA)

VI Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS317	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the basic components of a multimedia project.

CO2: Understand the usage of text and formats in multimedia.

CO3: Understand the audio digitization, audio file format and audio software.

CO4: Understand the colour, image, image formats and Correction in multimedia.

CO5: Understand the digital video standards, formats and basic principles behind animation and techniques.

UNIT– I

Introduction to Multimedia: What is multimedia, Components of multimedia, Web and Internet multimedia applications, Transition from conventional media to digital media.

UNIT– II

Computer Fonts and Hypertext: Usage of text in Multimedia, Families and faces of fonts, outline fonts, bitmap fonts International character sets and hypertext, Digital fonts techniques.

UNIT– III

Audio fundamentals and representations: Digitization of sound, frequency and bandwidth, decibel system, data rate, audio file format, Sound synthesis, MIDI, wavetable, Compression and transmission of audio on Internet, Adding sound to your multimedia project, Audio software and hardware.

UNIT– IV

Image fundamentals and representations: Colour Science, Colour, Colour Models, Colour palettes, Dithering, 2D Graphics, Image Compression and File Formats :GIF, JPEG, JPEG 2000, PNG, TIFF, EXIF, PS, PDF, Basic Image Processing, Use of image editing software, White balance correction, Dynamic range correction, Gamma correction, Photo Retouching.

UNIT– V

Video and Animation: Video Basics, How Video Works, Broadcast Video Standards, Analog video, Digital video, Video Recording and Tape formats, Shooting and Editing Video, Video Compression and File Formats. Video compression based on motion compensation, MPEG-1, MPEG-2, MPEG-4, MPEG-7, MPEG-21, Animation: Cell Animation, Computer Animation, Morphing.

Text Books :

1. Tay Vaughan, “Multimedia making it work”, Tata McGraw-Hill, 2008.
2. Rajneesh Aggarwal & B. B Tiwari, “ Multimedia Systems”, Excel Publication, New Delhi, 2007.
3. Li & Drew, “ Fundamentals of Multimedia” , Pearson Education, 2009.

Reference Books :

1. Parekh Ranjan, “Principles of Multimedia”, Tata McGraw-Hill, 2007.
2. Anirban Mukhopadhyay and Arup Chattopadhyay, “Introduction to Computer Graphics and Multimedia”, Second Edition, Vikas Publishing House.

Web References:

1. https://www.wisdomjobs.com/e-university/multimedia-tutorial-270.html
2. http://www.multimediatrainingvideos.com/
3. https://www.tutpad.com/tag/multimedia

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End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions .i.e. there will be two questions from each unit and the student should answer any one question.

SERVICE ORIENTED ARCHITECTURE & WEB SERVICES (SOA & WS)

VI Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS318	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand software oriented architectures.

CO2: Design medium scale software project development using SOA principles.

CO3: Develop SOA messages from business use cases.

CO4: Design and implementation of modern SOA and SOA-specific methodologies, technologies and standards.

CO5: Create composite services by applying composition style.

UNIT– I

Introduction To SOA, Evolution Of SOA: Fundamental SOA; Common Characteristics of contemporary SOA; Common tangible benefits of SOA; An SOA timeline (from XML to Web services to SOA); The continuing evolution of SOA (Standards organizations and Contributing vendors); The roots of SOA (comparing SOA to Past architectures).

UNIT– II

Web Services and Primitive SOA: The Web services framework• Services (as Web services); Service descriptions (with WSDL); Messaging (with SOAP).
Web Services and Contemporary SOA – I Message exchange patterns; Service activity; Coordination; Atomic Transactions; Business activities; Orchestration; Choreography.
Web Services and Contemporary SOA-2: Addressing; Reliable messaging; Correlation; Polices; Metadata exchange; Security; Notification and eventing.

UNIT– III

Principles of Service - Orientation: Services orientation and the enterprise; Anatomy of a service oriented architecture; Common Principles of Service orientation; How service orientation principles interrelate; Service orientation and object orientation; Native Web service support for service orientation principles.

UNIT– IV

Service Layers: Service orientation and contemporary SOA; Service layer abstraction; Application service layer, Business service layer, Orchestration service layer; Agnostic services; Service layer configuration scenarios.

UNIT– V

Business Process Design: WS-BPEL language basics; WS Coordination overview; Service oriented business process design; WS addressing language basics; WS Reliable Messaging language basics.
SOA Platforms: SOA platform basics; SOA support in J2EE; SOA support in. ET; Integration considerations.

TextBooks :

4. Thomas Erl, Service-Oriented Architecture: Concepts, Technology and Design, Prentice Hall Publication, 2005.
5. Michael Rosen, Boris Lublinsky, Applied SOA Service Oriented Architecture and Design Strategies, Wiely India Edition, 2008.

Reference Books :

3. James McGovern, Sameer Tyagi, Michael E Stevens, Sunil Mathew, ―Java Web Services Architecture, Elsevier, 2003.
4. Ron Schmelzer et al. ― XML and Web Services, Pearson Education, 2002.
5. Frank P.Coyle, ―XML, Web Services and the Data Revolution, Pearson Education, 2002.

Web References:

4. https://www.service-architecture.com
5. http://www.opengroup.org/soa/source-book/soa/p1.htm
6. https://www.javatpoint.com/service-oriented-architecture

Question Paper Pattern:

Sessional Exam

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End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions .i.e. there will be two questions from each unit and the student should answer any one question.

PATTERN RECOGNITION (PR)

VI Semester : B.Tech -CSE						Scheme : 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS319	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration : 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes : At the end of the course students will be able to

CO1: Summarize on supervised and unsupervised classification methods for various pattern recognition problems.

CO2: Compare various clustering techniques of unsupervised learning.

CO3: Understand various structural pattern recognition models.

CO4: Outline feature extraction and subset selection methods for various applications.

CO5: Analyze the neural networks for pattern recognition problems and Fuzzy Pattern Classifiers.

UNIT – I

Pattern Classifier

Overview of pattern recognition – Discriminant functions – Supervised and Unsupervised learning – Parametric estimation – Maximum likelihood estimation – Bayesian parameter estimation – Perceptron algorithm – LMSE algorithm – Problems with Bayes approach – Pattern classification by distance functions – Minimum distance pattern classifier.

UNIT – II

Unsupervised Classification

Clustering for unsupervised learning and classification – Clustering concept – C-means algorithm – Hierarchical clustering procedures – Graph theoretic approach to pattern clustering – Validity of clustering solutions.

UNIT – III

Structural Pattern Recognition

Elements of formal grammars – String generation as pattern description – Recognition of syntactic description – Parsing – Stochastic grammars and applications – Graph based structural representation.

UNIT – IV

Feature Extraction and Selection

Entropy minimization – Karhunen – Loeve transformation – Feature selection through functional approximation – Binary feature selection.

UNIT – V

Recent Advances

Neural network structures for Pattern Recognition – Neural network based Pattern associators – Unsupervised learning in neural Pattern Recognition – Self-organizing networks – Fuzzy logic – Fuzzy pattern classifiers – Pattern classification using Genetic Algorithms.

Text Books :

1. Robert J.Schalkoff, “Pattern Recognition Statistical, Structural and Neural Approaches”, Wiley, India, 2009.
2. M. Narasimha Murthy and V. Susheela Devi, “Pattern Recognition”, Springer 2011
3. Sergios Theodoridis, Konstantinos Koutroumbas, “Pattern Recognition & Matlab Introduction”, Fourth edition, Acadamic press, 2010

Reference Books :

1. Andrew R. Webb, Keith D. Copsey, “Statistical Pattern Recognition”, Third Edition, Wiley, 2011.
2. Duda R.O., Har P.E.,and David G Stork, “Pattern Classification”, Second edition, John Wiley & Sons, NewYork, 2012.
3. S.N. Deepa , S.N. Sivanandam, “Principles of Soft Computing”, Second Edition, Wiley, 2012.
4. Tou and Gonzales, “Pattern Recognition Principles”, Wesley Publication Company, London, 1974.

Web References:

1. https://www.mathworks.com/discovery/pattern-recognition.html
2. https://www.igi-global.com/book/pattern-recognition-classification-time-series/147125
3. https://www.mathworks.com/discovery/pattern-recognition.html

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End Exam

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DESIGN PATTERNS (DP)

VI Semester : B.Tech CSE						Scheme: 2017		
Course	Category	Hours/Week			Credits	Maximum Marks		
CS320	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the usage of design patterns for solving object oriented design problems.

CO2: Describe the creational patterns abstract factory, factory method, builder, prototype, and singleton.

CO3: Understand structural patterns: adapter, bridge, composite, decorator, facade, fly weight, proxy.

CO4: Explain behavioral patterns chain of responsibility, command, interpreter, iterator, mediator, memento, observer, state, strategy, template method, and visitor.

CO5: Explain the patterns used in solving design problems of Lexi Document Editor.

UNIT– I

Design Pattern Introduction

What Is a Design Pattern, Describing Design Patterns, the Catalog of Design Patterns, Organizing the Catalog, How to Select a Design Pattern, How to Use a Design Pattern, How Design Patterns Solve Design Problems.

UNIT– II

Creational Patterns

Abstract Factory Pattern, Builder Pattern, Factory Method Pattern, Prototype Pattern, Singleton Pattern.

UNIT– III

Structural Patterns

Adapter Pattern, Bridge Pattern, Composite Pattern, Decorator Pattern, Facade Pattern, Flyweight Pattern, Proxy Pattern.

UNIT– IV

Behavioral patterns

Chain of responsibility Pattern, Command Pattern, Interpreter Pattern, Iterator Pattern, Mediator Pattern, Memento Pattern, Observer Pattern, State Pattern, Strategy Pattern, Template method Pattern, Visitor Pattern.

UNIT– V

A Case Study

Designing a Document Editor, Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation.

Text Books :

1. Erich Gamma [2008], Design Patterns elements of reusable object oriented software, Pearson Education.
2. Frank Buschmann, RegineMeunier, Hans Rohnert, Peter Sommerlad, Michael Stal, Pattern-Oriented Software Architecture: A System of Pattern, John Wiley & Sons; 1996.

Reference Books :

1. Mark Grand, Pattern's in JAVA Vol-I, Wiley DreamTech.
2. Mark Grand, Pattern's in JAVA Vol-II, Wiley DreamTech.
3. Mark Grand [2006], JAVA Enterprise Design Patterns Vol-III, Wiley DreamTech.
4. Eric Freeman-Oreilly-spd, Head First Design Patterns.
5. Alan Shalloway,Design Patterns Explained, Pearson Education.

Web References :

1. https://sourcemaking.com/design_patterns
2. https://www.oodesign.com/

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ADVANCED DATABASE MANAGEMENT SYSTEMS (ADBMS)

VI Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS321	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Summarize the basic concepts of object-based databases.

CO2: Explain different database system architectures and concepts of parallelism in databases.

CO3: Illustrate the concepts of distributed databases.

CO4: Explain the automated information retrieval systems.

CO5: Outline the concepts of transactions in databases.

UNIT– I

Object Based Databases

Complex data types, Structured types and Inheritance in SQL. Table inheritance, Array and Multiset types in SQL, Object identity and reference types in SQL, Implementing O-R features. Persistent programming languages, Object-Oriented v/s Object relational.

UNIT– II

Database System Architecture

Centralized and Client–server architectures, Server system architectures, Parallel systems.

Parallel Databases

Introduction, I/O parallelism, Inter query parallelism, Intra query parallelism, Intra operation parallelism, Inter operation parallelism, Design of parallel systems.

UNIT– III

Distributed Databases

Homogeneous and Heterogeneous databases, Distributed data storage, Distributed Transactions, Commit protocols, Concurrency control in distributed databases, Availability, Distributed query processing, Heterogeneous distributed database.

UNIT– IV

Information–retrieval systems

Overview, Relevance ranking using terms and Hyperlinks, Synonyms, Homonyms and Ontologies, Indexing of documents, Measuring retrieval, effectiveness Web search engines, Information retrieval and Structured data.

UNIT– V

Advanced Transaction processing

Transaction processing, Monitors, Transactional workflows, Main memory databases, Real time transaction systems, Long duration transactions, Transaction management in Multi databases.

Text Books :

1. Henry F. Korth & Abraham Silberschatz,6th edition [2017], *Database System Concepts*

Reference Books :

1. Ramez Elmasri , Navathe [2009], *Fundamentals of Database systems.*
2. R. Ramakrishnan, J. Gehrke, Database Management Systems, McGraw Hill, 2009

Web References:

1. http://www.exploredatabase.com/2014/03/advanced-dbms-topics.html
2. https://www.tutorialspoint.com/distributed_dbms/
3. https://dsinghpune.wordpress.com/advanced-database-management-system/

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SOFT COMPUTING(SC)

VI Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS322	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Design the perceptron model using supervised learning.

CO2: Design the associative memory networks and hamming networks.

CO3: Understand the classical sets, fuzzy sets, classical relation and fuzzy relation.

CO4: Understand the techniques for fuzzification, defuzzification and fuzzy arithmetic.

CO5: Understand the operators used in genetic algorithm.

UNIT– I

Artificial Neural Networks: Introduction, Basic models of ANN, important terminologies of ANNs.
Supervised Learning Networks: Perceptron Networks, Adaptive Linear Neuron, Back propagation Network.

UNIT– II

Associative Memory Networks: Training Algorithms for pattern association Auto associative Memory, Bidirectional Associative Memory (BAM), and Hopfield Networks.

Unsupervised Learning Network: Introduction, Fixed Weight Competitive Nets, Maxnet, Mexican Hat Net, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks.

UNIT– III

Introduction to Fuzzy Logic, Classical Sets and Fuzzy Sets: Introduction, Classical Sets (Crisp Sets), Fuzzy Sets, Classical Relations -and Fuzzy Relations- Cardinality, Operations, Properties and composition. Tolerance and equivalence relations.

UNIT– IV

Membership functions- Features, Fuzzification, membership value assignments, Defuzzification

Fuzzy Arithmetic and Fuzzy Measures: Fuzzy arithmetic, Extension principle, Fuzzy measures

UNIT– V

Genetic Algorithm: Introduction, Basic Terminologies in Genetic Algorithm, Operators in Genetic Algorithm –Encoding, selection, Crossover and Mutation, Applications.

Text Books :

1. S.N.Sivanandam, S.N.Deepa "Priciples of Soft Computing" WILEY Second Edition 2013
2. S. Rajasekaran & G.A. Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic, and Genetic Algorithms synthesis and application", 2011, PHI.

Reference Books :

1. S.R. Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing" First Edition, 2015 Pearson Education.
2. Saroj Kaushik, Sunita Tewari, Soft computing: Fundamentals, Techniques and applications, First Edition, 2018, Mcgrawhill.
3. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", Third edition (2011),Wiley.

Web References:

1. https://swayam.gov.in/course/4574-introduction-to-soft-computing
2. https://tutorialspoint.com/artificial_neural_network/artificial_neural_network_pdf_version.htm

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second sessional exam. Question No 1which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question.

COMPUTER SIMULATION & MODELLING (CSM)

VI Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS323	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the characteristics and models of computer simulation.

CO2: Describe Monte Carlo Inventory Simulation and Random Number Generation.

CO3: Explain characteristics of queueing models.

CO4: Summarize the concepts of Simulation languages GPSS, SLAM, GEMS, SIMSCRIPT, IFPS

CO5: Understand model and syntax of GPSS.

UNIT– I

Introduction to Computer Simulation: Definition, types of models, characteristics of mathematical model, basic concepts and terminology, simple simulation model, uses of simulation, life cycle of simulation model, applications of simulation.

UNIT– II

Monte Carlo Inventory Simulation: Basic inventory concepts, fixed order quantity model, monte carlo inventory model.

Random Number Generation: Properties, methods for generating random numbers, digital computer methods, statistical tests for randomness, testing random numbers from the IBM pc versions of basic.

UNIT– III

***Simulating queuing models*:** Basic terminology, simple queuing system, approaches to queuing problems, important characteristics of queuing system, simulating tool crib operation.

UNIT– IV

Special Purpose Simulation Languages: Advantages & disadvantages of simulation languages, selection criteria of simulation language.

Simulation Languages: GPSS, SLAM, GEMS, SIMSCRIPT, IFPS, current trends in simulation languages.

UNIT– V

***General Purpose Simulation System (GPSS)*:** Introduction, elementary concepts in GPSS, nature of a model, transactions, facilities, structure of a model, syntax of a GPSS, storage and some SNAS.

Text Books:

1. Hugh j. Watson, John H. Blackstone(jr), *Computer Simulation,* Second Edition, 1989, Wiley Publications.
2. KRV Subramanian and Sundaresan, System Simulation and Introduction to GPSS, 1997, CBS Publications.

Reference Books:

1. Frank L. Severance, *System Modeling and Simulation*, Wiley, 2001.
2. Averill M. Law and W. David Kelton, *Simulation Modeling and Analysis*, Third Edition, McGraw Hill, 2006.

Web References:

1. https://nptel.ac.in/courses/112107220/2

Question Paper Pattern:

Sessional Exam:

The question paper for Sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second Sessional exam. Question No 1, which carries 6 marks, contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

ADHOC AND SENSOR NETWORKS (ASN)

VII Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS407	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Explain the concepts, network architectures and applications of ad hoc and wireless sensor networks.

CO2: Describe MAC protocols of ad hoc wireless networks.

CO3: Explain characteristics, design issues and classification of routing and transport layer protocols in ad hoc wireless networks.

CO4: Summarize the architecture of WSN along with MAC protocols for WSNs.

CO5: Understand routing issues, localization and QoS in WSN.

UNIT– I

Introduction: Fundamentals of Wireless Communication Technology, The Electromagnetic Spectrum, Radio propagation Mechanisms, Characteristics of the Wireless Channel.
mobile ad hoc networks (MANETs) and wireless sensor networks (WSNs): concepts and architectures. Applications of Ad Hoc and Sensor networks, Design Challenges in Ad hoc and Sensor Networks.

UNIT– II

MAC Protocols for Ad Hoc Wireless Networks: Issues in designing a MAC Protocol, Classification of MAC Protocols, Contention based protocols, Contention based protocols with Reservation Mechanisms, Contention based protocols with Scheduling Mechanisms, Multi channel MAC-IEEE 802.11.

UNIT– III

***Routing Protocols and Transport Layer in Ad Hoc Wireless Networks*:** Issues in designing a routing and Transport Layer protocol for Ad hoc networks, proactive routing, reactive routing (on-demand), hybrid routing, Classification of Transport Layer solutions, TCP over Ad hoc Wireless Networks.

UNIT– IV

Wireless Sensor Networks (WSNs) and MAC Protocols: Single node architecture: hardware and software components of a sensor node, WSN Network architecture: typical network architectures, data relaying and aggregation strategies, MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4.

UNIT– V

***WSN Routing, Localization & QoS*:** Issues in WSN routing, OLSR, Localization: Indoor and Sensor Network Localization, absolute and relative localization, triangulation, QOS in WSN, Energy Efficient Design, Synchronization, Transport Layer issues.

Text Books:

1. C. Siva Ram Murthy and B. S. Manoj, *Ad Hoc Wireless Networks: Architectures and Protocols*, Prentice Hall Professional Technical Reference, 2008.

Reference Books:

3. Carlos De Morais Cordeiro and Dharma Prakash Agrawal, *Ad Hoc & Sensor Networks: Theory and Applications*, World Scientific Publishing Company, 2006.
4. Jagnnathan Sarangapani, *Wireless Ad Hoc and Sensor Networks-Protocols, Performance and Control*, CRC press, Taylor & Francis group, 2007.

Web References:

3. http://cse.iitkgp.ac.in/~smisra/course/wasn.html
4. https://www.youtube.com/playlist?list=PLJ5C_6qdAvBHroAfekCO7K4xphEF74UPc

Question Paper Pattern:

Sessional Exam:

The question paper for Sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second Sessional exam. Question No 1, which carries 6 marks, contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

Parallel and Distributed Algorithms (PDA)

<table>
<tr><td colspan="5">VII Semester: B.Tech-CSE</td><td colspan="4">Scheme: 2017</td></tr>
<tr><td>Course Code</td><td>Category</td><td colspan="3">Hours/Week</td><td>Credits</td><td colspan="3">Maximum Marks</td></tr>
<tr><td rowspan="2">CS408</td><td rowspan="2">Professional Elective</td><td>L</td><td>T</td><td>P</td><td>C</td><td>Continuous Internal Assessment</td><td>End Exam</td><td>TOTAL</td></tr>
<tr><td>3</td><td>0</td><td>0</td><td>3</td><td>40</td><td>60</td><td>100</td></tr>
<tr><td colspan="5">Sessional Exam Duration:2 Hrs</td><td colspan="4">End Exam Duration:3 Hrs</td></tr>
</table>

Course Outcomes: At the end of the course students will be able to

CO1: Understand the types of parallel computers and demand for computational speed.

CO2: Summarize the message passing techniques and partitioning techniques.

CO3: Understand the pipelining techniques using pipeline programs.

CO4: Interpret the synchronous computations and distributed termination detection algorithms.

CO5: Understand the distributed shared memory systems and programming techniques.

UNIT– I

Basic Techniques

The Demand for Computational Speed, Potential for Increased Computational Speed, Types of Parallel computers, Cluster Computing

UNIT– II

Message Passing Technique

Basics of Message-Passing Programming, Using a Cluster of Computers, Evaluating Parallel Programs, Debugging and Evaluating Parallel Programs Empirically, Partitioning, Partitioning and Divide-and-Conquer examples

UNIT– III

Pipelined Computations

Pipeline Techniques, computing platform, pipeline programs examples-solving a system of linear Equations, Sorting numbers, prime number generation.

UNIT– IV

Synchronous Computations

Synchronization, Synchronized Computation, Synchronous Iteration Program Examples ,Partially Synchronous Methods

Load Balancing and Termination Detection

Load Balancing, Dynamic Load Balancing, Distributed Termination Detection Algorithms

UNIT– V

Distributed shared memory systems and programming

Achieving constant memory in a DSM system, distributed shared memory programming primitives, sorting algorithms.

Text Books :

1. Parallel Programming, Barry Wilkinson, Michael Allen, Pearson Education, 2nd Edition
2. Parallel and Distributed Systems**,** Arun Kulkarni , Nupur Prasad Giri, Nikhilesh Joshi Bhushan Jadhav, Wiley Publications, 2nd Edition.

Reference Books :

1. Introduction to Parallel algorithms, Jaja, Pearson, 1992.
2. Introduction to Parallel Algorithms, C.Xavier and S.S. Iyengar, Wiley Series.

Web References:

1. https://www.tutorialspoint.com/parallel_algorithm/parallel_algorithm_introduction.htm

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second sessional exam. QuestionNo1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions .i.e. there will be two questions from each unit and the student should answer any one question.

CLOUD COMPUTING (CC)

VII Semester: CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS409	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration: 3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the layers and types of clouds.

CO2: Understand the Virtual Machine Provisioning and Migration Services in cloud

CO3: Understand the Aneka Cloud Architecture and Hybrid Cloud Architecture.

CO4: Analyse the Cloud Computing Services provided by Google, Amazon, Microsoft, Sales force and IBM.

CO5: Understand the Cloud Applications, Best Practices and Future of Cloud.

UNIT– I

Introduction to Cloud Computing: Roots of Cloud Computing, Layers and Types of Clouds, Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Opportunities.

UNIT– II

Virtual Machine Provisioning and Migration Services: Introduction and Inspiration, Virtual Machines (VM), VM Provisioning and Manageability, VM Migration Services, VM Provisioning in the Cloud Context, and Future Research Directions.

UNIT– III

Aneka-Integration of Private and Public Clouds: Introduction, Aneka Cloud Architecture, Aneka Resource Provisioning Service, Aneka Hybrid Cloud Architecture and Implementation steps.

UNIT– IV

Cloud computing with Titans: Google: Google App Engine, Google Web ToolKit. Microsoft: Azure services platform, windows live, Exchange online, sharepoint services, Microsoft Dynamic CRM. Amazon: Amazon EC2, Amazon simpleDB, Amazon S3,Amazon front cloud, Amazon SQS, Amazon Book store, Salesforce.com: force.com, CRM, App Exchange, IBM: services, movements to cloud, security

UNIT– V

Cloud Applications, Best Practices and Future of Cloud: GrepTheWeb on Amazon cloud, ECG. Analyze your service, Best Practices, How cloud computing might Evolve in Future.

Text Books :

1. “Cloud Computing: Principles and Paradigms” by Rajkumar Buyya, James Broberg, and Andrzej Goscinski, Wiley Press, New York, USA, 2011.
2. "Cloud Computing: A Practical Approach" by Anthony T.Velte, Toby J Velte, Robert Elsenpeter. McGraw-Hill, Inc. New York, NY, USA, 2010

Reference Books :

1. “Architecting the Cloud: Design Decisions for Cloud Computing Service Models” by Michael J. Kavis, Wiley Press, 2014
2. “Enterprise Cloud Computing Technology Architecture Applications” by Gautam Shroff, Cambridge University Press, 2010.
3. “Cloud Computing Strategies” by Dimitris N. Chorafas, CRC Press ,2010.

Question Paper Pattern:

Sessional Exam:

The question paper for Sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second Sessional exam. Question No 1, which carries 6 marks, contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

COMPUTER VISION (CV)

VII Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
CS410	Professional Elective	3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand modelling of image formation.

CO2: Understand image feature detection and mapping.

CO3: Understand segmentation by clustering

CO4: Understand geometric methods.

CO5: Understand probabilistic and inferential methods

UNIT– I

IMAGE FORMATION AND IMAGE MODELS - Geometric Camera Models - Geometric Camera Calibration - Radiometry - Measuring Light – Shadows and shading.

UNIT– II

MULTIPLE IMAGES - The Geometry of Multiple Views - Stereopsis - Affine Structure from Motion - Projective Structure from Motion.

UNIT– III

Segmentation by Clustering - Segmentation by Fitting a Model - Segmentation and Fitting using Probabilistic Methods - Tracking with Linear Dynamic Models.

UNIT– IV

GEOMETRIC METHODS -Model-Based Vision - Smooth Surfaces and their Outlines - Aspect Graphs - Range Data.

UNIT– V

PROBABILISTIC AND INFERENTIAL METHODS - Recognition by Relations between Templates - Geometric Templates from Spatial Relations – Application – Image Based Rendering.

Text Books :

11. Forsyth D A and Ponce J Computer Vision: A Modern Approach – Prentice Hall 2003
12. Horn B K P Robot Vision Cambridge MIT press 1986

Reference Books :

1. Y Shirai Three-Dimensional Computer Vision Springer Verlag 1987
2. Wechsler Computational Vision Academic Press 1987
3. Haralick R M and Shapiro L G Computer and Robot Vision Vo I and II Addison Wesley 1993
4. Jain R C Kasturi R Machine Vision McGrawHill 1995

Web References:

1. http://kercd.free.fr/linksKCD.html
2. https://www.cs.ubc.ca/~lowe/vision.html
3. http://www.visionscience.com/

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No1which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions .i.e. there will be two questions from each unit and the student should answer any one question.

INTRODUCTION TO BLOCK CHAIN TECHNOLOGY (BCT)

VIII Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS418	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Familiarise the concepts of blockchain and cryptocurrency paradigms.

CO2: Understand blockchain ecosystem and development platforms.

CO3: Understand fundamental economic principles of blockchain technology.

CO4: Understand applications of blockchain technology.

CO5: Identify challenges in blockchain technology.

UNIT– I

Currency: Technology Stack, The Double-Spend and Byzantine Generals' Computing Problems, How a Crypto currency Works, Summary.

UNIT– II

Contracts: Financial Services, Crowd funding, Bitcoin Prediction Markets, Smart Property, Smart Contracts, Blockchain 2.0 Protocol Projects, Wallet Development Projects, Blockchain Development Platforms and APIs, Blockchain Ecosystem, Ethereum, Dapps, DAOs, DACs, and DASs, Automatic Markets and Tradenets, The Blockchain as a Path to Artificial Intelligence.

UNIT– III

Extensibility of Blockchain Technology Concepts, Fundamental Economic Principles, Distributed Censorship-Resistant Organizational Models, Digital Identity Verification, Digital Art, Blockchain Government.

UNIT– IV

Efficiency and Coordination Applications Beyond Currency, Economics, and Markets, Blockchain Science, Blockchain Genomics, Blockchain Health, Blockchain Learning, Blockchain Academic Publishing

UNIT– V

Advanced Concepts: Terminology and Concepts, Currency, Token, Tokenizing, Currency, Currency Multiplicity, Demurrage Currencies. Limitations: Technical Challenges, Business Model Challenges, Scandals and Public Perception, Government Regulation , Privacy Challenges for Personal Records , Overall: Decentralization Trends Likely to Persist.

Text Books :

1.Swan, Melanie. *Blockchain: Blueprint for a new economy*. " O'Reilly Media, Inc.", 2015.

Reference Books :

1.Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Narayanan, et. al. Princeton, 2016. ISBN: 978

2.Mastering Bitcoin: Programming the Open Blockchain, 2nd ed., Antonopoulos, O'Reilly, 2017. ISBN: 978

Web References:

1. https://redis.io/
2. https://www.javatpoint.com/nosql-databases
3. https://www.oracle.com/database/technologies/related/nosql.html

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second sessional exam. Question No1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions .i.e. there will be two questions from each unit and the student should answer any one question.

WIRELESS NETWORKS (WN)

VIII Semester: B.Tech-CSE					Scheme: 2017			
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
CS419	Professional Elective	3	0	0	3	**40**	**60**	**100**
Sessional Exam Duration:2 Hrs					**End Exam Duration:3 Hrs**			

Course Outcomes: At the end of the course students will be able to

CO1: Understand the design and performance issues of Cellular & Ad hoc wireless networks.

CO2: Demonstrate the Medium Access Control (MAC) layer protocols with scheduling mechanisms.

CO3: Compare the Table driven, On Demand Ad hoc routing protocols**.**

CO4: Summarize the transport layer design goals, network security issues of Ad Hoc Wireless Networks

CO5: Apply the Quality of Service frameworks in Ad Hoc Wireless Networks

UNIT– I

Introduction:

Computer Networks, Computer Network Software, Computer Network Architecture.

Ad Hoc Wireless Networks:

Introduction, Cellular and Ad Hoc Wireless Networks, Applications of Ad Hoc Wireless Networks, Issues in Ad Hoc Wireless Networks, Ad Hoc Wireless Internet

UNIT– II

MAC Protocols for Ad Hoc Wireless Networks:

Introduction, Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design Goals of a MAC protocol for Ad Hoc Wireless Networks, Classifications of MAC protocols, Contention-Based Protocols, Contention – Based MAC Protocols with Scheduling Mechanisms

UNIT– III

Routing Protocols for Ad Hoc Wireless Networks:

Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classifications of Routing Protocols, Table- Driven Routing Protocols, On-Demand Routing Protocols

UNIT– IV

Transport Layer in Ad Hoc Wireless Networks:

Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP over Ad Hoc Wireless Networks, Other Transport Layer Protocols for Ad Hoc Wireless Networks, Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks

UNIT– V

Quality of Service in Ad Hoc Wireless Networks:

Introduction, Issues and Challenges in providing QoS in Ad Hoc Wireless Networks, Classifications of QoS Solutions, QoS Frameworks for Ad Hoc Wireless Networks.

Text Books :

1. Ad Hoc Wireless Networks: Architectures and Protocols- C. Siva Ram Murthy and B.S.Manoj, Pearson Education, Inc 2014.
2. Ad Hoc Mobile Wireless Networks – Subir Kumar Sarkar, T G Basvaraju, C Puttamadappa, Auerbach Publications,2012

Reference Books :

1. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control –Jagannathan Sarangapani, CRC Press.
2. C D M Cordeiro, D. P. Agarwal, Adhoc and Sensor Networks: Theory and applications, World Scientific, 2006.
3. Jochen Schiller, Mobile Communications, Second Edition, Pearson Education, 2003.
4. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer.

Web References:

https://nptel.ac.in/courses/106105160/

Question Paper Pattern:

Sessional Exam

The question paper for Sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second Sessional exam. Question No1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER / OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER / OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions .i.e. there will be two questions from each unit and the student should answer any one question.

Note:

1. Network Simulator 2 (NS2) can be used to analyze the MAC and Routing protocols for Ad hoc Routing Protocols in Unit-II & III.
2. Scope for Apply type of questions for Assignments from Units- II & IV.

REAL TIME SYSTEMS (RTS)

VIII Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
CS420	Professional Elective	3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the basic concepts of real time computing.

CO2: Understand various types of Task Scheduling algorithms.

CO3: Understand Real-time programming environments.

CO4: Understand Real time communication protocols.

CO5: Compare traditional and real time databases.

UNIT– I

Introduction to Real time computing

Concepts, Example of real-time applications, Structure of a real time system, Characterizing Real Time Systems and Tasks- Performance measures for real time systems, Estimating Program Run Times.

UNIT– II

Task assignment and Scheduling

Classical Uniprocessor Scheduling Algorithms, Uniprocessor Scheduling of IRIS Tasks, Task Assignment, Fault tolerant scheduling, RTP, RTCP

UNIT– III

Programming Languages and Tools

Desired Language Characteristics, Data Typing, Control Structures, Facilitating hierarchical decomposition, Run time error handling, Task Scheduling, Timing Specifications, Some Experimental Languages, Programming Environments, Run time Support.

UNIT– IV

Real Time Communication

Network topologies, Network architecture issues, Protocols- contention based, token based, polled bus, deadline based protocol, Fault tolerant routing.

UNIT– V

Real time Databases

Transaction priorities and aborts, Concurrency control issues, Disk scheduling algorithms, Two phase approach to improve predictability, Databases for hard Real time systems.

Text Books :

1. C.M. Krishna, Kang G. Shin – " Real Time Systems", International Edition, McGraw Hill Companies, Inc., New York, 1997
2. Philip A. Laplante and Seppo J. Ovaska, "Real-Time Systems Design and Analysis: Tools for the Practitioner'' IV Edition IEEE Press, Wiley. 2011

Reference Books :

1. Jane W.S. Liu, Real-Time Systems, Pearson Education India, 2000.
2. Rajib Mall, "Real –Time System: Theory and Practice." Pearson, 2008

Question Paper Pattern:

Sessional Exam

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e there will be two questions from each unit and the student should answer any one question.

DEEP LEARNING(DLE)

VIII Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS421	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the historical trends in deep learning and use Tensor flow for performing Linear Regression, Gradient Descent, optimizers, graph visualization and training curves.

CO2: Summarize the fundamentals of Artificial Neural Networks.

CO3: Understand the training of Deep Neural Nets.

CO4: Understand the Convolutional Neural Networks Architecture.

CO5: Understand the Recurrent Neural Networks and deep RNN training.

UNIT– I

Introduction to Deep Learning : Introduction, Historical trends in Deep Learning

Up and Running with TensorFlow

Installation, Creating Your First Graph and Running It in a Session, Managing Graphs, Lifecycle of a Node Value, Linear Regression with TensorFlow. Implementing Gradient Descent, Feeding Data to the Training Algorithm, Saving and Restoring Models, Visualizing the Graph and Training Curves Using TensorBoard, Name Scopes, Modularity, Sharing Variables.

UNIT– II

Introduction to Artificial Neural Networks

From Biological to Artificial Neurons, Training an MLP with TensorFlow's High-Level API, Training a DNN Using Plain TensorFlow, Fine-Tuning Neural Network Hyperparameters

UNIT– III

Training Deep Neural Nets

Vanishing/Exploding Gradients Problems, Reusing Pretrained Layers, Faster Optimizers, Avoiding Overfitting Through Regularization

UNIT– IV

Convolutional Neural Networks

The Architecture of the Visual Cortex, Convolutional Layer, Pooling Layer., CNN Architectures : LeNet-5, AlexNet, GoogLeNet, ResNet.

UNIT– V

Recurrent Neural Networks

Recurrent Neurons, Basic RNNs in TensorFlow, Training RNNs, Deep RNNs

Text Books :

1. "Deep Learning" Ian Goodfellow Yoshua Bengio Aaron Courville, MIT Press book.
2. "Hands-On Machine Learning with Scikit-Learn and TensorFlow" March 2017: First Edition

Reference Books :

1. "Neural Networks and Deep Learning", Michael Nielsen.
2. "Neural Networks and Deep Learning " Aggarwal, Charu C.Springer International Publishing.

Web References:

1. https://www.coursera.org/specializations/deep-learning?
2. https://www.coursera.org/learn/introduction-tensorflow?

Question Paper Pattern:

Sessional Exam:

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End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

DIGITAL FORENSICS (DF)

VIII Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
CS422	Professional Elective	3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the fundamental concepts of computer forensics.

CO2: Understand the rules, tpes and procedure of evidence collection.

CO3: Analyze to validate the computer forensics data.

CO4: Summarize the tools needed for computer forensics.

CO5: Understand file systems of Microsoft Windows and DOS systems.

UNIT– I

Computer Forensics Fundamentals: What is Computer Forensics?, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps taken by Computer Forensics Specialists Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement, Computer Forensic Technology, Types of Business Computer Forensic Technology Computer Forensics Evidence and Capture: Data Recovery Defined, Data Back-up and Recovery, The Role of Back-up in Data Recovery, The Data-Recovery Solution.

UNIT– II

Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options, Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collection, Artifacts, Collection Steps, Controlling Contamination: The Chain of Custody Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene, Computer Evidence Processing Steps, Legal Aspects of Collecting and Preserving Computer Forensic Evidence Computer Image Verification and Authentication: Special Needs of Evidential Authentication, Practical Consideration, Practical Implementation..

UNIT– III

***Computer Forensics analysis and validation*:** Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project. Processing Crime and Incident Scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case

UNIT– IV

Current Computer Forensic tools: Evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software E-Mail Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools. Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

UNIT– V

***Working with Windows and DOS Systems*:** Understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS-DOS startup tasks, virtual machines.

Text Books:

1. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning

Reference Books:

1. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning
2. Computer Evidence Collection & Presentation by Christopher L.T. Brown, Firewall Media.

Web References:

1. https://www.cs.nmt.edu/~df/lectures.html
2. https://www.youtube.com/playlist?list=PLGB2uErtks4pTmi7iy9ean8TR2utFvqrg

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HIGH PERFORMANCE COMPUTING (HPC)

VIII Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS423	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the limitations, control structure and communication models of parallel computer systems.

CO2: Summarize the decomposition techniques and mapping techniques for parallel algorithms.

CO3: Understand One-to-all, all-to-one and all-to-all communication operations for parallel computers.

CO4: Interpret the programming techniques using message passing paradigm.

CO5: Understand the thread programming for shared address space platforms using OpenMP.

UNIT– I

Introduction

Implicit parallelism, limitations of memory system performance, control structure of parallel platforms, communication model of parallel platforms, message passing costs in parallel computers, routing mechanisms for interconnection networks.

UNIT– II

Parallel algorithm design

Decomposition techniques, tasks and interactions, mapping techniques for load balancing, methods for reducing interaction overheads, parallel algorithm models- the data parallel model, the task graph model, the work pool model, the master-slave model, the pipeline model, hybrid models.

UNIT– III

Basic communication operations

One-to-All Broadcast and All-to-One Reduction, All-to-all Broadcast and reduction, scatter and gather, Improving the speed of some communication operations: splitting and routing messages in parts, all port communication.

UNIT– IV

Programming using message passing paradigm

Principles of message passing programming, The building blocks, MPI: The message passing interface, topologies and embedding, overlapping communication with computation: non blocking communication operations.

UNIT– V

Programming shared address space platforms

Threads, POSIX threads, synchronization primitives, attributes of threads and mutex, OpenMP – The programming model, specifying concurrent tasks: assigning iterations to threads, synchronization across multiple for directives, merging directives, nesting parallel directives.

Text Books :

3. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Introduction to Parallel Computing, Second Edition, Pearson Education, 2007.
4. Benedict R Gaster, Lee Howes, David R Kaeli Perhaad Mistry Dana Schaa, Heterogeneous Computing with OpenCL, McGraw-Hill, Inc. Newyork, 2011.

Reference Books :

3. Michael J. Quinn, Parallel Programming in C with MPI and OpenMP, McGraw-Hill International Editions, Computer Science Series, 2004.
4. Jason Sanders, Edward Kandrot, CUDA by Example – An Introduction to General-Purpose *GPU* Programming, Addison Wesley, 2011.

Web References:

1. https://www.tutorialspoint.com/parallel_algorithm/parallel_algorithm_introduction.html
2. https://computing.llnl.gov/tutorials/openMP
3. https://nptel.ac.in/courses/106108055

Question Paper Pattern:

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End Exam

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IMAGE AND VIDEO PROCESSING (IVP)

VIII Semester: B.Tech- CSE								**Scheme: 2017**
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CS424	Professional Elective	**L**	**T**	**P**	**C**	**Continuous Internal Assessment**	**End Exam**	**TOTAL**
		3	0	0	3	**40**	**60**	**100**
Sessional Exam Duration:2 Hrs						**End Exam Duration: 3 Hrs**		

Course Outcomes: At the end of the course students will be able to

CO1: Understand the relationships between pixels in digital images and perform various linear and non-linear operations on pixels in a digital image.

CO2: Apply various image enhancement techniques both in spatial and frequency domain.

CO3: Understand image compression models and different types of compression techniques.

CO4: Perform Image segmentation on real time images.

CO5: Understand the principles of Video imaging and Video display.

UNIT– I

Digital Image Fundamentals: Definition and Applications of Digital Image Processing – Components of Image Processing System - Human Visual System - Image Sensing Acquisition - Image Sampling and Quantization - Some Basic Relationships between Pixels, Spatial and Gray Level Resolution, Image Interpolation - Linear And Non Linear Operations.

UNIT– II

Image Enhancement and Restoration: Histogram Modification Techniques – Image Smoothening – Image Sharpening – Image Restoration – Degradation Model – Noise Models – Spatial Filtering – Frequency Domain Filtering.

UNIT– III

Image Compression: File format (bmp, tiff, pcx, gif, jpeg.) - Compression fundamentals – Image Compression Models: Error Free Compression: Huffman Coding, Arithmetic Coding, LZW coding, Bit plane Coding, Lossless Predictive Coding; Lossy Compression: Lossy Predictive Coding, Block Transform coding - Digital Watermarking

UNIT– IV

Image Segmentation: Point, Line and Edge Detection - Thresholding – Region Based Segmentation – Segmentation Using Morphological Watersheds - The Use of Motion in Segmentation

UNIT– V

Introduction to Video Processing: Video Capture and Display- Principles of Color Video Imaging, Video Cameras, Video Display, Composite versus Component Video; Analog Video Raster- Progressive and Interlaced Scan, Characterization of a Video Raster; Analog Color Television Systems; Digital Video.

Text Books :

1. Rafael Gonzalez & Richard Woods, Digital Image Processing, 3rd Edition. Pearson publications, 2012
2. Anil K. Jain, Fundamental of Digital Image Processing, PHI publication, 2013.
3. Video Processing and Communications- Yao Wang, Jorn Ostermann, Ya-Qin Zhang

Reference Books :

1. Pratt, Digital Image Processing, 4th Edition, Wiley Publication, 2007.
2. S. Jayaraman, S. Esakkirajan & T. Veera Kumar, Digital Image Processing, Mc. Graw Hill, 2011.
3. S. Sridhar, Digital Image Processing, Oxford University Press, 2011.

Web References:

https://en.wikipedia.org/wiki/Digital_image_processing

https://reference.wolfram.com/language/guide/ImageProcessing.html

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EMBEDDED SYSTEMS (EBS)

VIII Semester: B.Tech-CSE						Scheme: 2017		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS425	Professional Elective	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	40	60	100
Sessional Exam Duration:2 Hrs						End Exam Duration:3 Hrs		

Course Outcomes: At the end of the course students will be able to

CO1: Provides general overview of Embedded Systems

CO2: Show current statistics of embedded systems.

CO3: Design, Code, Compile, and test real time software.

CO4: Understand the RTOS Environment

CO5: Integrate a fully functional system including hardware and software.

UNIT– I

Introduction to embedded Systems: Embedded systems, processor embedded into a system, Embedded hardware units and device in a system, Embedded software in a system, Examples of embedded systems, Design process in embedded system, formalization of system design, Design process and design examples, Classification of embedded systems, skills required for an embedded system designer.

UNIT– II

Devices and communication buses for devices network: IO types and example, Serial communication devices, Parallel device ports, Sophisticated interfacing features in device ports, wireless devices, timer and counting devices, Watch dog timer, Real time clock, networked embedded systems, Serial bus communication protocols, parallel bus device protocols – parallel communication internet using ISA, PCI, PCI-X and advanced buses, internet enabled systems – network protocols, wireless and mobile system protocols.

UNIT– III

Device drivers and interrupts and service mechanisms: Programming – I/O busy-wait approach without interrupt Service mechanism, ISR concept, interrupt sources, interrupt servicing (handling) Mechanism, multiple interrupts, context and periods for context switching , interrupt latency and deadline, classification of processors interrupt service mechanisms from context-saving angle, Direct memory access, device driver programming

UNIT– IV

Inter Process communication and synchronisation of processes, Threads and tasks: Multiple process application, multiple threads in an application,Tasks, Task states, Task and Data, Clear-cut distinction between functions. ISRS and tasks by their characteristics, concept and semaphores, shared data, Inter-process communication, Signal function, Semaphore functions, Message Queue functions, Mailbox functions, Pipe functions, Socket functions, RPC functions.

UNIT– V

Real – time Operating Systems: OS Services, process management, Timer functions, Event functions, Memory management, Device, file and IO subsystems management, Interrupt routines in RTOS environment and handling of interrupt source calls. Real-time Operating systems, Basic Design using RTOS, RTOS task scheduling models, interrupt latency and response of the tasks as performance metrics, OS Security issues, Introduction to embedded software development process and tools, Host and target machines, linking and location software

Text Books :

2. Raj Kamal [2017], [3rd Edition], Embedded Systems – Architecutre, Programming and Design, McGraw-Hill.

Reference Books :

1. Arnold S Burger, Embedded System Design An Introduction to Processes, Tools and Techniques, 1st Edition, CMP Books, 2007.
2. David.E. Simon, An Embedded Software Primer,2nd Edition, Pearson Edition, 2009.
3. Jonathan W Valvano, Embedded Micro Computer Systems, Real Time Interfacing,1st Edition, Books / Cole,Thomson learning 2006.

Web References:

1. https://nptel.ac.in/courses

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